THE

AMERICAN GAS-LIGHT JOURNAL

THE OFFICIAL GAZETTE OF

LIGHT, HEAT, WATER-SUPPLY, AND SEWERAGE.

Iron Buildings, Nos. 254 & 256 Canal Street, East, near Broadway, New York.

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For Engravings, see AMERICAN GAS-LIGHT JOURNAL for June, 1860, page 345. Address the Patentee, JOHN P. KENNEDY, Trenton, N. J.

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TO INVENTORS.—Patent Agency of the AMERICAN GAS-LIGHT JOURNAL.—The Proprietor of the AMERICAN GAS-LIGHT JOURNAL, is happy to announce that a

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MISCELLANEOUS.

COAL LANDS AT PUBLIC AUCTION. In pursuance of a decree rendered in the Kanawha Circuit Court, at the special term, held in January, 1861, the undersigned, as Special Commissioner, will offer for sale at PUBLIC AUCTION to the highest bidder, in front of the Court House door of Kanawha County, Virginia, on TUESDAY, the 16th April, next, a certain tract of land belonging to the Coal River and Kanawha Mining and Manufacturing Company, estimated to contain 4,000 ACRES (excepting therefrom 44 acres in dispute, and the surface interest in 269 acres of the said 4 000 acre tract). The said lands abound in CANNEL, SPLINT, and BITUMINOUS COAL; are situated in Kanawha County, Va., on Briar Creek and the navigable waters of Coal River. TERMS OF SALE, five per cent of the purchase money in cash on the day of sale, and the residue thereof in three equal annual instalments, with interest thereon from day of sale, the purchaser giving bonds, with approved security, and a lien retained on the lands for the deferred payments.

THOMAS L. BROUN, Special Commissioner.

February 14, 1861.

TO THE CREDITORS OF THE NORTH AMERICAN GAS-LIGHT CO.—The Receiver of this Company gives notice to such of the creditors of this Company as have not presented their claims, to present the same to him, at his office, No. 20, Nassau street, New York, on or before the 1st of April, next.—Dated Feb. 16, 1861. PHILO T RUGGLES, Receiver.

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New York, March 11, 1861.

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Samples of the above castings can be seen at the Rooms of the AMERICAN GAS-LIGHT JOURNAL.

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H. R. WORTHINGTON'S Patent Water-Meter.—This Meter combines accuracy, simplicity and remarkable durability, with such ease and certainty of motion, as to offer no appreciable obstructions to the flow of water in the pipes to which it is connected, as it runs and registers upon three inches head, or when delivering the smallest stream. These qualities, with its low cost, have caused its extensive adoption by corporations and individuals, in many of our largest cities.
HENRY R. WORTHINGTON,
61 Beekman street, N. Y.

WHERE GAS-WORKS AND WATER-WORKS ARE WANTED.

We are now publishing regularly the names of the thirty thousand post-towns in the United States, so that builders of gas-works and water-works, and the various manufacturers may see where are new openings for business. And as each post master will receive several copies of the AMERICAN GAS-LIGHT JOURNAL, for distribution, the number thus circulated will probably exceed *Three Million Copies. What a chance for advertisers!*

POST-OFFICE TOWNS IN THE UNITED STATES,

ARRANGED BY STATES AND COUNTIES,

Shewing where Gas-Works and Water-Works are Wanted

INDIANA.

91 Counties, 1,161 Towns, 7 Gas-Works, 2 Water-Works.

Adams County.

Canoper, Limber Lost, Monmouth,
Decatur, (c. h.,) Linn Grove, Pleasant Mills.
Kirkland,

Allen County.

Aboite, Leo, Perry,
Arcola, Little River, Po,
Chamberlain, Maples, Randall,
Fort Wayne, (c. h.,) Massillon, Ridge Road,
Hall's Corners, Monroeville, Root,
Harlan, New Haven, Surinam,
Heller's Corners, Nine Mile, Taw Taw.

Bartholomew County.

Azalia, Hartsville, Newbern,
Burnsville, Hope, Rock Creek,
Clifford, Jonesville, Taylorsburgh,
Columbus, (c. h.,) Kansas, Taylorsville,
Elizabethtown, Moore's Vineyard, Wallesboro',
Goldsborough, Mount Healthy, Waynesville.

Benton County.

Catalpa Grove, *Oxford*, (c. h.,) Parish Grove.
Mount Gilboa,

Blackford County.

Dundee, Montpelier, Priam.
Hartford City, (c.h.,)

Boone County.

Elizaville, Northern Depot, Thorntown,
Jamestown, Northfield, White Lick,
Lebanon, (c. h.,) Reese's Mills, Whitestown,
New Brunswick, Royalton, Zionsville.

Brown County.

Bean Blossom, Milo, *Nashville*, (c. h.,)
Christianaburg, Mount Liberty, New Bellsville,
Cleona, Mount Moriah, Spearsville,
Gold Creek,

Carroll County.

Burlington, Deer Creek, Pittsburgh,
Camden, Fetherhuff's Mills, Prince William,
Carroll, Lockport, Rockfield,
Cornucopia, Mount Jefferson, Wild Cat.
Delphi, (c. h.,)

Cass County.

Amsterdam, Lincoln, Onward,
Anoka, *Logansport*, (c. h.,) Royal Centre,
Crittenden, Metea, Spring Creek,
Fitch, Montez, Twelve Mile,
Galveston, New Waverly, Walton.
Lewisburg,

Clark County.

Bennettsville, Jeffersonville, Polk Run,
Bethlehem, Memphis, Sellersburg,
Blue Lick, Muddy Fork, Slate Cut,
Bowyer's Landing, New Providence, Sylvan Grove,
Charlestown, (c. h.,) New Washington, Utica.
Hubbard, Oregon.

Clay County.

Anguilla, Chrysty's Prairie, Howesville,
Ashborough, Cloverland, Martz,
Belle Air Coffee, Poland,
Bowling Green, (c.h.,) Farm, Staunton,
Brazil, Harmony, Van Buren.
Centre Point.

Clinton County.

Barnesville, Geetingsville, Middle Fork,
Berlin, Jefferson, Rossville,
Colfax, Kirk's Cross Roads, Russiaville,
Frankfort, (c. h.,) Michigantown, Winship's Mill.

Crawford County.

English. Magnolia, Mount Prospect,
Fredonia, (c. h.,) Marengo, Nebraska,
Grantsburg, Mifflin, Pilot Knob,
Leavenworth, Milltown, Wickliffe.

Daviess County.

Alfordsville, High Rock, Owl Prairie,
Black Oak Ridge, Hudsonville, Plainville,
Clark's Prairie, Maysville, Raglesville,
Epsom, Montgomery's Station, *Washington*, (c. h.)

Dearborn County.

Aurora, Guilonsville, Moore's Hill,
Graysville, Holman, New Alsace,
Hart, Jones' station, Saint Leon,
Cleveland, Kelso, Sparta,
Coopersville, *Lawrenceburgh*, (c.h.,) Van Wedding's Stat'n.
Dillsborough, Lawrenceville, Wilmington,
Farmer's Retreat, Logan, Wright's Corners,
Guilford, Manchester, Yorkville.

Decatur County.

Adams, Kingston, Smyrna,
Cave Spring, McKoy's Station, Spring Hill,
Clarksburgh, Millhousen, Waynesburgh,
Clifty, Rossburgh, Westport,
Forest Hill, Saint Omer, Williamstown,
Greensburgh, (c. h.,) Saint Paul, Wintersville.
Jackson, Sardinia,

De Kalb County.

Artic De Kalb, Normstown,
Auburn, (c. h.,) Fairfield Centre, Spencerville,
Butler, Iba, Taylor's Corners,
Coles' Corners Mount Hope, Victor,
Corunna, Newville, Woolsey.

Delaware County.

Albany, Harrison, Selma,
Anthony, Muncie, Sharon,
Daleville, New Burlington, Wheeling,
Eaton, New Corner, Yorktown.
Granville, Richwoods,

Dubois County.

Birdseye, Haysville, *Jasper*, (c. h.,)
Celestine, Holland, Ludlow,
Ditney Hill, Huntingburgh, Porterville,
Ferdinand, Ireland, Worth.

Elkhart County.

Benton, *Goshen*, (c. h.,) New Paris,
Bristol Locke, Pine Creek,
Cook's Station, Middlebury, South West,
Elkhart, Mount Olive, Vistula.
Fish Lake,

Fayette County.

Alquina, Everton, Null's Mills,
Bentonville, Falmouth, Orange,
Columbia, Harrisburgh, Waterloo.
Connersville, (c. h.,) Longwood,,

Floyd County.

Edwardsville, Georgetown, *New Albany*, (c. h.,)
Floyd Knobs, Greenville, Scottsville.
Galena,

Fountain County.

Attica, Harveysburgh, Portland,
Cole Creek, Headley's Mills, Rob Roy,
Covington, (c, h.,) Hillsborough, Steam Corner.
Fountain City, Newtown, Wallace.

Franklin County.

Andersonville, Laurel, Peppertown,
Blooming Grove, Metamora, Saint Peters,
Blue Creek, Mixersville. South Gate,
Brookville, (c. h.,) Mount Carmel, Springfield,
Cedar Grove, New Trenton, Stip's Hill,
Drewersburgh, Oak Forest, Whitcomb,
Fairfield, Oldenburgh, Wynn.
Jennings,

Fulton County.

Akron, Bruce's Lake, Kewanna,
Aubbeenaubbee, Fulton, Mill Ark,
Bloomingsburgh, Green Oak, *Rochester*, (c. h.)
Blue Grass, Indian Field,

Gibson County.

Bovine, Haubstadt, Port Gibson,
Buckskin, Hazleton. *Princeton*, (c. h.,)
Dangola, Marsh Creek, Somerville,
Fort Branch, Owensville, West Buena Nista.
Francisco, Patoka,

Grant County.

Arcana, Jonesboro', Rigdon,
Grant, *Marion*, Slash,
Greenbush, Mier, Trask,
Jadden, Oak Woods, Walnut Creek.
Jalapa, Point Isabel,

Greene County.

Blanton, Lone Tree, Point Commerce,
Bloomfield, (c. h.,) Marco, Scotland,
Buck Creek, Newberry, Solsberry,
Hobbieville, Owensburgh, Worthington,
Jasonville, Pleasant Ridge, Wright,
Linton,

Hamilton County.

Arcada, Clarksville, Noblesville,
Boxley, Deming, Sheiliville,
Carmel, Eagletown, Strawtown,
Cicero, New Britton, Westfield.

Hancock County.

Charlottesville, Kinder, Walpole,
Cleveland, McCordsville, Warrington,
Eden, Mount Comfort, Westland,
Greenfield, (c. h.,) Philadelphia, Willow Branch,
Harvey, Sugar Creek, Woodbury.

Harrison County.

Barren, Hancock, New Salisbury,
Bradford, Knob Creek, Palmyra,
Byrneville, Laconia, Rosewood,
Corydon, (c. h.,) Lanesville, Sharp's Mills
Crisp's Cross Roads, Mauckport, Spring Dale.
Elizabeth, New Amsterdam, White Cottage.

Hendricks County.

Amo, Coatesville, Pecksburg,
Belleville, *Danville*, (c. h.,) Pittsboro',
Brownsburgh, New Elizabeth, Plainfield,
Cartersburgh, New Winchester, Springtown,
Cincinnatus, North Salem, Stilesville.
Clayton,

Henry County.

Ashland, Lewisville, Ogden,
Blountsville, Luray, Raysville,
Cadiz, Mechanicsburgh, Rogersville,
Dan Webster, Middletown, Spiceland,
Devon, Millville, Sulphur Springs,
Greensboro', *New Castle*, (c. h.,) Wenona.
Knightstown, New Lisbon,

Howard County.

Alto, Jerome, Poplar Grove,
Cassville, *Kokomo*, (c. h.,) Shanghai,
Centre, New London, Vermont,
Greentown, Oakford, West Liberty.

Huntington County.

Antioch, *Huntington*, (c. h.,) Mount Etna,
Australia, Mahon, Price,
Bayou Mills. Majenica, Roanoke,
Branch Creek, Markle, Warren.

Jackson County.

Baker's Mills, Freetown, Seymour,
Brownstown (c. h.,) Houston, Sparksville,
Cortland, Medora, Tampico,
Craine's Mills, New Farmington, Valley Farm,
Crothersville, Newry, Valonia,
Dudleytown, Reddington, Woodville.
Ewing, Rockford,

Jasper County.

Brook, Morrocco, Rensselaer,
Carpenter's Creek, Pilot Grove, Walkersville,
Davison, Pleasant Grove, White's Grove.

Jay County.

Bear Creek, Half Way, New Mount Pleasant,
Bluff Point, Hector, Pennville,
Boundary, Jay C. H, Salamonia,
Dunkirk, Monroe, Westchester.
Gillum, New Corydon,

Jefferson County.

Barbersville, Kent, Salada,
Bryantsburg, Lancaster, South Hanover,
Camargo, *Madison*, (c. h.,) Stony Point,
Canaan, Manville, Swanville,
Dupont, Mud Lick, Volga,
Graham, North Madison, Wirt.
Home,

Jennings County.

Benville, Oakdale, Six Mile,
Brewersville, Otter Creek, Tripton,
Butlerville, Paris, *Vernon*, (c. h.,)
Cana, Queensville, Weston,
Hopewell, San Jacinto, Zenas.
Montgomery, Scipio,

Johnson County.

Amity, *Franklin*, (c. h.,) Nineveh,
Bluff Creek, Greenwood, Trafalgar,
Edinburgh, Musselman, Worthsville.

Knox County.

Bruceville, Lovely Dale, Pond Creek Mills,
Busseron, Maria Creek, Spaldingville,
Decker's Station, Oak Station, *Vincennes*, (c. h.,)
Edwardsport, Paw-Paw Bend, Wheatland.
Lecompton,

Kosciusko County.

Beaver Dam, Milford, Sevastople,
Boydston's Mills, North Galveston, Silver Lake,
Claypool, Oneida, Syracuse,
Clear Spring, Oswego, *Warsaw*, (c. h.,)
Etna Green, Palestine, Wooster.
Farmers, Pierceton, Yellow Creek.
Leesburgh, Rose Hill,

La Grange County.

Brighton, *La Grange*, (c. h.,) Ringgold,
Brushy Prairie, Lima, South Milford,
Fly Creek, Marcy, Utah,
Greenfield's Mills, Mongoquinong. Wolcott's Mills.
Haw Patch, Ontario,

Lake County.

Cedar Lake, Hanover, Outlet,
Crown Point, (c. h.,) Hobart, Ross,
Deep River, Lake Station, Saint John,
Dyer, Merrillville, West Creek,
Eagle Creek, Orchard Grove, Winfield.
Gibson's Station,

Laporte County.

Bigelow's Mills, Hudson, Puddletown.
Big Springs, Kankakee, Rolling Prairie,
Calliao, Kingsbury, Roselle,
Crossing, *Laporte*, (c. h.,) Sauk Village,
Door Village, Michigan City, Union Mills,
Haskell, New Durham, Westville.

Lawrence County.

Avoca, Guthrie, Leesville,
Bedford, (c. h.,) Heltonville, Mitchell,
Bono, Huron, Pinhook,
Bryantsville, Juliet, Silverville,
Fayetteville, Lawrenceport, Spring Mill,
Fort Ritner, Leatherwood, Springville.
Georgia,

Madison County.

Alexandria, Fishersburg, Pendleton,
Alfont, Forestville, Perkinsville,
Anderson, (c. h.,) Frankton, Prosperity,
Bock's Mills, Huntsville, Santa Claus,
Chesterfield, Mendon, Summitville,
Curtis, Oceola, Zinsburgh.
Duck Creek, Ovid,

CHARGE FOR WATER IN ENGLAND BY METER.

KING'S LYNN WATER-WORKS.—The Corporation upon the recommendation of the Water-Works Committee have resolved to adopt the following scale of charges for the supply of water by meter to the different Steam Manufactories in the Town and to parties other than Brewers and Malsters requiring a supply independent of their own family consumption, viz.

		GALLONS	d.	
Quarterly Consumption under		10,000	9	PER 1000 GALLONS.
Exceeding	10,000 and under	20,000	8½	
"	20 000 "	50,000	8	
"	50,000 "	100 000	7½	
"	100,000 "	200,000	7	
"	200 000 "	400,000	6½	
"	400,000 "	800,000	6	
"	800,000 "	1600,000	5½	
"	1600,000		5	

WATER-METER RENT.

For each Meter capable of delivering—

		s.	d.	
100	Gallons per hour	1	3	per quarter.
200	" "	1	6	"
400	" "	2	0	"
600	" "	2	6	"
800	" "	3	0	"
1000	" "	4	6	"
2000	" "	6	0	"
3000	" "	7	6	"
4000	" "	9	6	"

High pressure Engines will be charged at the rate of £1 per horse power per annum, and Condensing Engines by Meter only.

AUGUSTA, GEO.—The stock of this Gas-Light Company is reported to have sold at public sale there, on 5th inst., at $36 per share—the par being $25; equal to 44 per cent premium. This is a wood-gas company.

THE CHEMICAL HISTORY OF A CANDLE.

By Professor Faraday.

A course of six Lectures (adapted to a Juvenile audience) Delivered before the Royal Institution of Great Britain.

A CANDLE—THE FLAME—ITS SOURCES—STRUCTURE—MOBILITY—BRIGHTNESS.

I purpose thanking you for the honor you do us in coming to see what are our proceedings here, by bringing before you the Chemical History of a Candle. I have done so on a former occasion, and if I had my own will, I should do it almost every year; so abundant is the interest that attaches itself to the subject, so wonderful are the varieties of outlet which it gives into the various departments of philosophy. There is not a law under which any part of this universe is governed, which does not come into play and is touched upon in these phenomena. There is no better, there is no more open door by which you can enter into the study of natural physical philosophy, than by considering the phenomena of a candle. Therefore I believe I shall not disappoint you in choosing this for my subject rather than any newer form, which could not be better, if it were so good.

And having said so much to you, let me say this also: that though our subject be so great, and our intention that of treating it honestly, philosophically and seriously, yet I mean to pass away from all those here who are seniors. I claim the right of speaking to juveniles as a juvenile myself. I have done it on former occasions, and, if you please, I shall do it again. And though I know that I stand here with the knowledge of having the words I utter given to the world, yet that shall not deter me from speaking in the same familiar way to those whom I esteem nearest to me on this occasion. You know that though we make no publication of our proceedings—neither I nor the authorities—we give all facilities to those who honor us by supposing what they hear here is worth conveying further—we give them every facility to hear us and write about us, but it is entirely their own act. You have here the original, in whatever shape it appears anywhere else.

And now to my boys and girls.

I must first tell you what candles are made of. Some are very curious things. I have here some bits of timber, branches of trees particularly famous for their burning. And here you see a piece of that very curious substance taken out of some of the bogs of Ireland, called *candle-wood*, a hard, strong, excellent wood, evidently fitted for good work as a resister of force, and yet withal burning so well that when it is found they make splinters of it and torches, since it burns like a candle, and gives a very good light indeed. And here in this wood is one of the most beautiful illustrations of the general nature of a candle that I can possibly give. The fuel provided, the means of bringing that fuel to the place of chemical action, the regular and gradual supply of air to that place of action—heat and light—all produced by a little piece of wood of this kind, forming, in fact, a natural candle.

But we must here speak of candles as they are in commerce. Here are a couple of candles commonly called "dips." They are made of lengths of cotton cut off, hung up by a loop, dipped into melted tallow, taken out again and cooled, then re-dipped, until there is an accumulation of tallow round the cotton. In order that you may have an idea of the various characters of these candles, you see these which I hold in my hand—they are very small and very curious. They are, or were, the candles used by the miners in coal mines. In olden times the miner had to find his own candles, and it was supposed that a small candle would not so soon set fire to the fire-damp in the coal mines as a large one, and for that reason, as well as for economy's sake, he had candles made of this sort, 20, 30, 40, or 60 to the pound. They have been replaced by the steel mill, and then by the Davy lamp, and other safety lamps of various kinds. I have here a candle that was taken out of the *Royal George*, it is said by Sir George Pashley. It has been sunk in the sea for many years, subject to the action of salt water. It shows you how well candles may be preserved, for though it is cracked about and broken a good deal, yet when lighted it goes on burning regularly, and the tallow resumes its natural condition as soon as it is fused.

Mr. Field, of Lambeth, has supplied me abundantly with beautiful illustrations of the candle and its materials; I shall, therefore, now refer to them. And, first, there is the suet—the fat of the ox—Russian tallow, I believe, employed in the manufacture of these dips, which Gay Lussac, or some one who entrusted him with his knowledge, converted into that beautiful substance, stearine, which you see lying beside it. A candle, you know, is not now a greasy thing like an ordinary tallow candle, but a clean thing, and you may almost scrape off and pulverize the drops which fall from it without soiling anything. This is the process he adopted:—The fat or tallow is first boiled with quicklime, and made into a soap, and then the soap is decomposed by sulphuric acid, which takes away the lime, and leaves the fat rearranged as stearic acid, whilst a quantity of glycerine is produced at the same time. Glycerine—absolutely a sugar, or a substance similar to sugar—comes out of the tallow in this chemical change. The oil is then pressed out of it; and you see here this series of pressed cakes, showing how beautifully the impurities are carried out by the oily part as the pressure goes on increasing, and at last you have left that substance which is melted, and cast into candles as you here see them. The candle I have in my hand is a stearine candle, made of stearine from tallow in the way I have told you. Then here is a sperm candle, which comes from the purified oil of the spermaceti whale. Here also is yellow beeswax and refined beeswax, from which candles are made. Here too, is that curious substance called "paraffine," and some paraffine candles, made of paraffine obtained from the bogs of Ireland. I have here, also, a substance brought from Japan since we have forced an entrance into that out-of-the-way place—a kind of wax, which a kind friend has sent me, and which forms a new material for the manufacture of candles.

And how are these candles made? I have told you about dips, and I will show you how moulds are made. Let us imagine any of these candles to be made of materials which can be cast. "Cast!" you say. "Why, a candle is a thing that melts, and surely if you can melt it you can cast it." Not so. It is wonderful, in the progress of manufacture, and in the consideration of the means best fitted to produce the required result, how things turn up which one would not expect beforehand. Candles can not always be cast. A wax candle can never be cast. It is made by a particular process which I can illustrate in a minute or two, but I must not spend much time on it. Wax is a thing which, burning so well and melting so easily in a candle, cannot be cast. However, let us take a material that can be cast. Here is a frame with a number of moulds fastened in it. The first thing to be done is to put a wick through them. Here is one—a plaited wick, which does not require snuffing—supported by a little wire. It goes to the bottom, where it is pegged in, the little peg holding the cotton tight and stoping the aperture, so that nothing fluid shall run out. At the upper part there is a little bar placed across, which stretches the cotton and holds it in the mould, The tallow is then melted, and the moulds are filled. After a certain time, when the moulds are cool, the excess of tallow is poured off at one corner, and then cleaned off altogether, and the ends of the wick cut away. The candles alone then remain in the mould, and you have only to upset them, as I am doing, when out they tumble, for the candles are made in the form of cones, being narrower at the top than at the bottom, so that what with their form and their own shrinking, they only need a little shaking and out they fall. In the same way are made these candles of stearine and of paraffine. It is a curious thing to see how wax candles are made. A lot of cottons are hung upon frames, as you see here, and covered with metal tags at the ends, to keep the wax from covering the cotton in those places. These are carried to a heater where the wax is melted. As you see, the frames can turn round, and as they turn, a man takes a vessel of wax and pours it first down one, and then the next, and the next, and so on. When he has gone once round it, if it is sufficiently cool, he gives the first a second coat, and so on until they are all of the required thickness. When they have been thus clothed, or fed, or made up to that thickness, they are taken off and placed elsewhere. I have here, by the kindness of Mr. Field, several specimens of these candles. Here is one only half finished. They are then taken down and well rolled upon a fine stone slab, and the conical top is moulded by properly shaped tubes, and the bottoms cut off and trimmed. This is done so beautifully that they can make candles in this way weighing exactly four or six to the pound, or any number you please.

We must not, however, take up more time about the mere manufacture, but go a little further into the matter. I have not yet referred you to luxuries in candles (for there is such a thing as luxury in candles.) See how beautifully these are colored; you see here mauve, Magenta, and all the chemical colors recently introduced, applied to candles. You observe, also, different forms employed. Here is a fluted pillar most beautifully shaped; and I have also here some candles sent me by Mr. Pearsall, which are ornamented with designs upon them, so that, as they burn, you have, as it were, a glowing sun above, and a bouquet of flowers beneath. All, however, that is fine and beautiful, is not useful. These fluted candles, pretty as they are, are bad candles; they are bad because of their external shape. Nevertheless, I show you these specimens sent to me from kind friends on all sides, that you may see what is done and what may be done in this or that direction, though, as I have said, when we come to these refinements, we are obliged to sacrifice a little in utility.

Now as to the light of the candle. We will light up one or two, and set them at work in the performance of their proper functions. You observe a candle is a very different thing from a lamp. With a lamp you take a little oil, fill your vessel, put in a little moss or some cotton prepared by artificial means, and then light the top of the wick. When the flame runs down the cotton to the oil, it gets extinguished, but it goes on burning in the part above. Now, I have no doubt, you may ask, how is it that the oil, which will not burn of itself, gets up to the top of the cotton where it will burn? We shall presently examine that; but there is a much more wonderful thing about the burning of a candle than this. You have here a solid substance with no vessel to contain it; and how is it that this solid substance can get up to the place where the flame is? How is it that this solid gets there, it not being a fluid? or, when it is made a fluid, then how is it that it keeps together? This is a wonderful thing about a candle.

We have here a good deal of wind, which will help us in some of our illustrations, but teaze us in others; for the sake, therefore, of a little regularity, and to simplify the matter, I shall make a quiet flame, for who can study a subject when there are difficulties in the way not belonging to it. Here is a clever invention of some costermonger or street-stander in the market-place for the shading of their candles on Saturday nights, when they are selling their greens, or potatoes, or fish. I have very often admired it. They put a lamp-glass round the candle, supported on a kind of gallery, which clasps it, and it can be slipped up and down as required. By the use of this lamp-glass, employed in the same way, you have a steady flame, which you can look at and carefully examine, as I hope you will do, at home.

You see then, in the first instance, that a beautiful cup is formed. As the air comes to the candle, it moves upward by the force of the current which the heat of the candle produces, and it so cools all the sides of the wax, tallow or fuel, as to keep the edge much cooler than the part within; the part within melts by the flame that runs down the wick as far as it can go before it is extinguished, but the part on the outside does not melt. If I made a current in one direction, my cup would be lop-sided, and the fluid would consequently run over—for the same force of gravity which holds worlds together holds this fluid in a horizontal position, and if the cup be not horizontal, of course the fluid will run away in guttering. You see, therefore, that the cup is formed by this, fine uniform, regular ascending current of air upon all sides which keeps the exterior of the candle cool. No fuel would do for a candle, which has not the property of giving this cup, except such fuel as the Irish bog wood, where the thing is like a sponge and holds its own fuel. You see now why you would have had such a bad result if you were to burn these beautiful candles that I have shown you, which are irregular, intermittent in their shape, and cannot, therefore, have that nicely-formed edge to the cup which is the great beauty of a candle. I hope you will now see that the perfection of a process, that is, its utility, is the better point of beauty about it. It is not the best looking thing, but the best acting thing, which is the most advantageous to us. This good looking candle is a bad burning one. There will be a guttering round about it because of the irregularity of the stream of air and the badness of the cup which is formed thereby. You may see some pretty cases (and I expect you to think of these things) of the action of the ascending current when you have a little gutter run down the side of the candle, making it thicker there than it is elsewhere. As the candle goes on burning, that keeps its place and forms a little pillar sticking up by the side, because as it rises higher above the rest of the wax or fuel, the air gets bet-

ter round it, it is more cooled and better resists the action of the heat at a little distance. Now, the greatest mistakes and faults with regard to candles, as with regard to other points, often bring with them instruction which we would not receive if they had not occurred. We come here to be philosophers, and I hope you will always remember that whenever a result happens, especially if it is new, you should say, "What is the cause? Why does that occur?" and you will, in the course of time, find it out.

Then there is another point about these candles which will answer a question—that is, as to the way in which this fluid gets out of the cup, up the wick and into the place of combustion. You know that the flames on these wicks burning in candles made of beeswax, or stearine, or spermaceti, do not run down to the wax or other matter, and melt it all away, but keep to their own right place. They are fenced off from the fluid below, and do not encroach on the cup at the sides. I cannot imagine a more beautiful and more compact thing than the condition of adjustment under which a candle makes one part subserve to the other to the very end of its action. A combustible thing like that, burning away gradually, never being intruded upon by the flame, is a very beautiful sight; especially when you come to learn what a vigorous thing flame is—what power it has of destroying the wax itself when it gets hold of it, and destroying its proper form even before it gets hold of it, if it come too near.

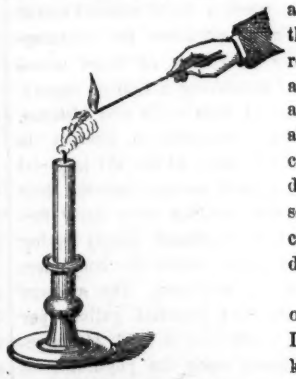
Now, how does it get hold of it? There is a beautiful point about that—*capillary attraction*. "Capillary attraction!" you say, "the attraction of hairs." Well, never mind the name; it was given in olden times, before we had a good understanding of what the real power was. It is by what is called capillary attraction that the fuel is conveyed to the part where combustion goes on, and is deposited there, not in a careless way, but very beautifully in the very midst of the centre of action, which takes place around it. Now I am going to give you one or two instances of capillary attraction. It is that kind of action or attraction which makes two things that do not dissolve in each other still hold together. When you wash your hands you wet them thoroughly: you take a little soap to make the adhesion better, and you find your hands remain wet. This is by that kind of attraction of which I am about to speak. And what is more; if your hands are not soiled (as they always are by the usages of life) if you put your finger into a little warm water, the water will creep a little way up your finger, though you may not stop to examine it. I have here a substance which is rather porous—a column of salt—and I will pour into the plate at the bottom, not water as it appears, but a saturated solution of salt which can not absorb more; so that the action which you see, will not be due to its disolving anything. We may consider the plate to be the candle and the salt the wick, and this solution the melted tallow. I have colored the fluid that you may see the action better. You observe that now I pour in the fluid, it rises and gradualy creeps up the salt higher and higher; and provided the column does not tumble over, it will go to the top. If this blue solution were combustible, and we were to place a wick at the top of the salt, it would burn as it entered into the wick. It is a most curious thing to see this kind of action taking place, and to observe how singular some of the circumstances are about it. When you wash your hands you take a towel to wipe off the water, and it is by that kind of wetting, or that kind of attraction, which makes the towel wet with water, that the wick is make wet with the tallow. I have known some careless boys and girls (indeed, I have known it happen to careful people as well) who, having washed their hands and wiped them with a towel, have thrown the towel over the side of the basin, and before long it has drawn all the water out of the basin and conveyed it to the floor, because it happened to be thrown over the side in such a way as to serve the purpose of a siphon. That you may the better see the way in which the substances act one upon another, I have here a vessel made

of wire gauze filled with water, and you may compare it in its action to the cotton, in one respect, or to a piece of calico in the other. In fact, wicks are sometimes made of a kind of wire gauze. You will observe that this vessel is a porous thing, for if I pour a little water on to the top, it will run out at the bottom. You would be puzzled for a good while, if I asked you what the state of this vessel is, what is inside of it, and why it is there? The vessel is full of water, and yet you see the water goes in and runs out as if it were empty. In order to prove this to you I have only to empty it. The reason is this—the wire being once wetted, remains wet: the meshes are so small that the fluid is attracted so strongly from the one side to the other, as to remain in the vessel although it is porous. In like manner, the particles of melted tallow ascend the cotton, and get to the top: other particles then follow by their mutual attraction for each other, and as they reach the flame, they are graduburned.

Here is another application of the same principle. You see this bit of cane. I have seen boys about the streets, who were very anxious to appear like men, take a piece of cane and light it and smoke it, as an imitation of a cigar. They are enabled to do so by the permeability of the cane in one direction, and by its capillarity. If I place this piece of cane on a plate containing some camphene (which is very much like paraffine in its general character,) exactly in the same manner as the blue fluid rose through the salt will this fluid rise through the piece of cane. There being no pores at the side, the fluid cannot go in that direction, but must pass through its length. Already the fluid is at the top of the cane, and now I can light it and form it into a candle. The fluid has risen by the capillary attraction of the piece of cane, just as it does through the cotton in the candle.

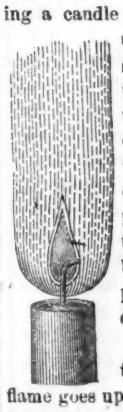
Now the only reason why the candle does not burn all down the side of the wick is that the melted tallow extinguishes, the flame. You know that a candle if turned upside down, so as to allow the fuel to run upon the wick, will be put out. The reason is that the flame has not had time to make the fuel hot enough to burn, as it does above. Where it is carried in small quantities into the wick, and has all the effect of the heat exercised upon it.

There is another condition which you must learn as regards the candle, without which you would not be able fully to understand the philosophy of it, and that is the vaporous condition of the fuel. In order that you may understand that, let me show you a very pretty but very common-place experiment. If you blow a candle out cleverly, you will see the vapor rise from it. You have, I know, often smelt the vapor of a blown-out candle, and a very bad smell it is; but if you blow it out cleverly, you will be able to see pretty well the vapor into which this solid matter is transformed. I will blow out one of these candles in such a way as not to disturb the air round about it, by the continuous action of my breath; and now, if I hold a lighted taper two or three inches from the wick, you will observe a train of fire going through the air till it reaches the candle. I am obliged to be quick and ready, because if I allow the vapor time to cool, it becomes condensed into a liquid or solid, or the stream of combustible matter gets disturbed.

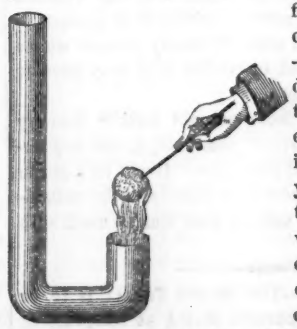


Now, as to the shape or form of the flame It concerns us much to know about the condition which the matter of the candle finally assumes at the top of the wick, where you have such beauty and brightness as nothing but combustion or flame can produce. You have the glittering beauty of gold and silver; and the still higher lustre of jewels like the diamond and ruby; but nothing of these comes by comparison near to the brilliancy and beauty of flame. What diamond can shine like flame? It owes its lustre at night time to the very flame shining upon it. The flame shines in darkness, but the light which the diamond has is as nothing, until the flame shines upon it, when it is brilliant again. The candle alone shines by itself and for itself, or for those who have arranged the materials. Now, let us look a little at the form of the flame as you see it under the glass shade. It is steady and equal, and its general form is that which is represented in the diagram, varying with atmospheric disturbances, and also varying with the size of the candle.

It is a bright oblong, brighter at the top than toward the bottom, with the wick in the middle, and beside the wick in the middle certain darker parts toward the bottom where the ignition is not so good as in the part above. I have a drawing here, made many years ago by Hooker, when he made his investigations. It is the drawing of the flame of a lamp, but it will apply to the flame of a candle. The cup of the candle is the vessel or lamp; the melted spermaceti is the oil; and the wick is common to both. Upon that he sets this little flame, and then he represents what is true, a certain quantity of matter rising about it which you do not see, and which, if you have not been here before, or are not familiar with the subject, you will not know of. He has here represented the parts of the surrounding atmosphere that are very essential to the flame and that are always present with it. There is a current formed, which draws the flame out, for the flame which you see is really drawn out by the current, and drawn upward to a great height, just as Hooker has here shown you, by that prolongation of the current in the diagram. You may see this by taking a lighted candle and putting it in the sun so as to get its shadow thrown on a piece of paper. What a remarkable thing it is that that thing which is light enough to produce shadows of other objects, can be made to throw its own shadow on a piece of white paper or card, so that you can actually see streaming round the flame something which is not part of the flame, but is ascending and drawing the flame upwards. Now I am going to imitate the sunlight, by applying the voltaic battery to the electric lamp. You now see our sun and its great luminosity; and by placing a candle between it and the screen, we get the shadow of the flame. You observe the shadow of the candle and of the wick; then there is a darkish part, as represented in the diagram, and then a part which is more distinct. Curiously enough, however, what we see in the shadow as the darkest part of the flame is, in reality, the brightest part, and here you see streaming upward the ascending current of hot air, as shown by Hooker, which draws out the flame, supplies it with air, and cools the sides of the cup of melted fuel.

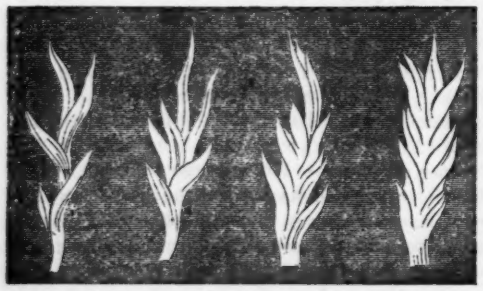


I can give you a little further illustration for the purpose of showing you how flame goes up or down according to the current. I have here a flame—it is not a candle flame—but you can, no doubt, by this time generalize enough to be able to compare one thing with another—what I am about to do is to change the ascending current that takes the flame upward into a descending current. This I can easily do by the little apparatus you see before me. The flame, as I have said, is not a candle flame, but it is produced by alcohol so that it shall not smoke too much. I will also color the flame with another substance, so that you may trace its course, for with spirit alone you could hardly see enough to have the opportunity of tracing its course of action. By lighting this spirit-of-wine, we have then a flame produced, and you observe that when held in the air it naturally goes upward. You understand now easily enough why flames go up under ordinary circumstances—it is because of the draft of air by which the combustion is formed. But now by blowing the flame down you see I am enabled to make it go downward into this little chimney, the direction of the current being changed. Before we have concluded this course of lectures, we shall show you a lamp in which the flame goes up, and the smoke goes down, or the flame goes down and the smoke goes up. You see, then, we have the power in this way of varying the flame in different directions.



There are now some other points which I must bring before you. Many of the flames you see here vary much in their shape by the currents of air blowing around

them in different directions; but we can, if we like, make flames so that they look like fixtures, and we can photograph them—indeed, we have to photograph them—so that they become fixed to us, if we wish to find out everything concerning them. That, however, is not the only thing I wish to mention. If I take a flame sufficiently large, it does not keep that homogeneous, that uniform condition of shape, but it breaks out with a power of life which is quite wonderful. I am about to use another kind of fuel, but it is truly and fairly representative of the wax or tallow of a candle. I have here a large ball of cotton, which will serve as a wick. And, now that I have immersed it in spirit and lit it, in what way does it differ from an ordinary candle? Why, it differs very much in one respect, that we have a vivacity and power about it, a beauty and life utterly unlike the light presented by a candle. You see those fine tongues of flames rising up. You have the same general disposition of the mass of the flame from below upward, but, in addition to that, you have this remarkable breaking out into tongues which you do not perceive in the case of a candle. Now, why is this? I must explain it to you, because when you understand that perfectly, you will be able to follow me better in what I have to say hereafter. I suppose some here will have made for themselves the experiment I am going to show you. Am I right in supposing that anybody here has played at snapdragon? I do not know a more beautiful illustration of the philosophy of flame, as to a certain part of its history, than the game of snapdragon. First, here is my dish; and let me say, that when you play snapdragon well you ought to have the dish well warmed; you ought also to have warm plums and warm brandy, which, however, I have not got. When you have put the spirit into your dish, you have the cup and the fuel; and are not the raisins acting like wicks? I now throw the plums into the dish, and light the spirits, and you see those beautiful tongues of flame that I have referred to. You have the air creeping in over the edge of the dish forming these tongues. Why? Because through the force of the current and the irregularity of the action of the flame, it cannot flow in one uniform stream. The air flows in so irregularly that you have, what would otherwise be a single image, broken up into a variety of forms, and each of these little tongues has an independent existence of its own. Indeed, I might say, you have here a multitude of independent candles. You must not imagine that because you see these tongues all at once, that the flame is of this particular shape. A flame of that shape is never so at any one time. Never is a body of flame like that which you just saw rising from the ball, of the shape it appears to you. It consists of a multitude of different shapes, succeeding each other so fast that the eye is only able to take cognizance of them all at once. In former times, I purposely analyzed



a flame of that general character, and this diagram shows you the different parts of which it is composed. They do not occur all at once; it is only because we see these shapes in such rapid succession that they seem to us to exist all at one time.

It is too bad that we have not got further than my game of snapdragon, but we must not, under any circstances, keep you beyond your time. It will be a lesson to me in future to hold you more strictly to the philosophy of the thing than to take up your time so much with these illustrations.

THE BERGEN TUNNEL.—The Bergen Tunnel is to be lighted with gas, from burners placed at intervals of fifty feet, and plumbers are now engaged in putting in the pipes for this purpose. The passenger trains of the road will probably not run through it before spring. A dirt train is now to be employed in carrying earth from the western end, at which place there is some 500,000 yards of earth, which is designed for use in filling in at the Long Dock.

PROPOSED WATER-SUPPLY FOR CHARLESTOWN, MASS.

Among the most important projects of the day affecting the health and comfort of a community, is that proposed for supplying the city of Charlestown, Mass., with pure and wholesome water. The report made for the City Council by Messrs. George R. Baldwin and Charles L. Stevenson, the Civil Engineers, to whom it was referred, contains much interesting matter, and as its length precludes its publication in our columns, we will give a condensed statement of its import.

In introducing into a city a supply of water from a foreign source, it is of primary importance that such streams or ponds be selected, as will not only be capable of furnishing pure and wholesome water, fit for all domestic and manufacturing purposes, but which will yield a quantity sufficient for prospective as well as present wants.

Upon an examination of the ponds and streams comparatively near Charlestown and Chelsea, it appears that there are several sources from which pure water can be obtained. Previous examinations of most of these sources have shown that, while the waters of all are of a quality suitable for supplying a city, there are but two unappropriated for like purposes that would seem worthy of consideration as being capable of yielding a supply for the wants of either Charlestown or Chelsea, viz: Spot and Mystic Ponds.

Spot Pond possesses the requisite purity, and has also an elevation ample for all practical purposes; but it is doubtful if the quantity of water it can supply will suffice for more than the present population of either city.

Mystic Pond has the required volume, but lying at a low level, (5.65 feet below the coping of the Dry Dock at the Navy Yard,) it will be necessary to separate the pure waters descending into it from the action of the tide flowing up Mystic River, and to elevate the water by artificial means to a reservoir at a sufficient height above the city. As Mystic Pond is deemed far preferable to any other source for the proposed supply, we will notice it only in connection with the able report before us.

SUPPLY OF WATER.

The amount of water adequate for a supply must be somewhat arbitrarily assumed. The quantity furnished in different cities in this country varies considerably; as from 30 gallons daily per head, in some of the interior towns, to 70 or more in other cities. So that, notwithstanding the erection of water-works on almost every scale for supplying the principal towns and cities of the United States and Europe, it furnishes no certain data for ascertaining the amount a given population may require, though it has shown that 30 gallons is the least supply that should be provided for each inhabitant. The great difference in the consumption of water is doubtless owing mainly to the positions of the towns supplied, both as regards climate and business pursuits, and somewhat to the character of the water-works themselves; for in those cities where a large amount can at all times be had, and for all purposes, the consumption per head is greatly in excess of those where works are only capable of furnishing a limited supply, or where a supply is obtained from wells and cisterns. Thus, while the nine water-companies in London, in 1850, supplied 270,581 houses with 44,383,332 imperial gallons of water per day, in 1856, having increased their facilities, 81,025,842 imperial gallons were daily furnished to 328,561 houses; an increased supply having nearly doubled the consumption, while the consumers had increased only about 21½ per cent. The average supply which, in 1854, was 164 imperial gallons per house (say 27 gallons per head), was, in 1856, 246 imperial gallons per house. Based upon the population of the districts supplied, the daily average amount furnished per head at the latter date, was nearly 40 imperial gallons. The inducements offered by an unlimited supply of water for all purposes, tends greatly to promote the introduction and carrying on of manufactures and steam-works generally; and if, to the large amounts used by such establishments and for fires, we add that for railways, shipping, &c., the consumption *pro rata* upon the population is largely augmented.

MYSTIC POND.

Mystic Pond is situated in the towns of Medford, West Cambridge, and Winchester, 4½ miles from the intersection of Medford and Main streets at Charlestown Neck. It has an area of 234 acres at its ordinary level, which is below mean high water at the mouth of the Mystic River, being 5.65 feet below the level of the coping of the Dry Dock at the Navy Yard. This pond, from the quality of its waters and the quantity it can be relied on to supply, is placed at the head of all other sources in the vicinity, requiring mechanical power for introducing water to the city. It was examined in 1836 by R. H. Eddy, Civil Engineer, who reported favorably concerning it, both as to quality and volume; and by the Commissioners of 1837 and 1838 it was deemed, in connection with Spot Pond, the proper source for supplying Boston; it being by them considered, though no measurements appear to have been made, as capable of yielding a greater supply than Lake Cochituate; while as to quality, the water, though more highly colored, was pronounced purer than that lake, though less pure than that of Spot Pond.

The area of country forming the drainage basin of Mystic Pond is thirty-one square miles, exclusive of the area of the water surfaces of the ponds and streams lying within the basin. The principal ponds are Horn, Wedge, and Winter, and the waters flowing from these and from streams rising in Reading, Wilmington, and Lexington, are used at various points upon their course for mill and factory purposes; so that the numerous ponds thus created, serve to collect and retain the water derived from the rainfall, checking at various points the rapid flow which would otherwise take place to the Mystic River. The motive-power derived from the waters is rendered available before reaching Mystic Pond, while no use is made of the waters flowing from it, if we except the using of the current for a small mill upon the Mystic River. The diversion, therefore, of any portion of the waters of this pond will not create damage to mills and water-rights, omitting the small mill above mentioned.

At the time of commencing the investigations, the streams and ponds were quite low, owing to the severe drouth which then prevailed; so that the height of Mystic Pond was in great measure due to the tides flowing up Mystic River. This action of the tides causes the water in the pond to become brackish, by the mingling of the salt-water; so that before making use of it for supplying the city, this inflow must be prevented.

To ascertain the difference in the tidal rise and time of high-water at the mouth of the Mystic River and at the pond, a record was kept at the Dry Dock under the direction of Mr. Billings, United States Constructing Engineer at the Charlestown Navy-Yard. From this it was found, that, during the time the observations were made, the height was from 0.58 to 1.22 feet less at the pond than at the Navy-Yard, these difierences being for tides rising at the Yard to heights of 15.41 and 15.86 feet above base respectively, whilst at Wood's Mill the difference was but an average of 0.35 feet: the difference in time of high water being from thirty to ninety minutes later at the pond than at the Navy-Yard.

The tidal rise above base at the mouth of the Mystic River, as compiled for the Coast Survey, is

Mean high tides	15 00
Spring " "	16 50
Storm " "	17.00
Highest recorded	20.40

As the quantity of water which the pond will yield at either level is more than sufficient to supply 6,000,000 gallons, there are then two methods by which it can be rendered suitable for supplying Charlestown or Chelsea; the one rendering necessary the flowage of about 100 acres of land around the borders of the pond, and the purchase of water-rights and buildings; the other, while it creates no damage to water-rights or by flowage, requires the water to be daily raised the additional height equal to the difference of level. For distinction, these are hereafter termed the High and Low Level, and estimates are made upon the cost of each method.

To raise the pond to the High Level so as to insure against the inflow of extraordinary tides, requires a height of 19 feet above base. At this height, a large part of the land required to be flowed, would be less than four feet below the surface of the pond; it would, therefore, be advisable, if a High Level is to be adopted, to raise the pond to 21 feet above base, which insures a depth of six feet, and requires the flowing of but 17 acres additional land. At this level, also, a mill privilege of equal value with that necessarily destroyed at the northern end of the pond, can be obtained at the outlet, as it will be some years before the full quantity of water the pond can supply will be required by the cities.

For the Low Level, the proper height for the pond would be 15 feet above base; at this height no land is required to be flowed, and it is above the level of mean high tides at the pond.

Whichever level is adopted, however, the method of conducting the water-supply from the pond would be the same, with the exception of the height of the conduit, pumping-well, &c.

LINE OF AQUEDUCT.

The route proposed for the line of aqueduct is nearly a straight line from the pond to the junction of Medford street with Main street at Charlestown Neck. This route, while it is the shortest in distance, is likewise the most suitable, the nature of the country being in every way favorable for the economical construction of the work proposed; and, though several other routes were surveyed, the advantages of this line are so manifest, both as regards distance and the physical feature of the country, that it is selected in preference to all others as insuring the greatest permanence to the work, with the least outlay for construction. To convey the water of Mystic pond to Charlestown so as to supply all parts of the city, it must be elevated to a reservoir sufficiently above the highest levels in that city.

It is proposed to commence the line of aqueduct near the southeasterly end of the pond, and convey the water by means of a conduit of hydraulic brick masonry and iron pipe, crossing the Mystic River, to a pumping or feed-well near the South bank of the river, and at the base of Walnut Hill, (so called), a few hundred feet west of the line of the Boston & Lowell Railroad. At this place the engines and pumps are to be erected, and from thence the water is forced through an iron main to a reservoir upon the top of Walnut Hill.

In extending the works to Chelsea, an additional length of aqueduct will be required for conveying the water to a reservoir conveniently situated for supplying that place.

WORKS TO BE CONSTRUCTED.

Dam or tide-gates at the pond.
Conduit in hydraulic masonry.
Pumping-engines, Pump-house.
Well and force Main.
Reservoir, Main Pipe and Distribution.

EXTENSION TO CHELSEA.

Iron mains and Syphons,
Pile Bridging,
Reservoir and Distribution.

DISTANCES IN FEET ACCORDING TO THE SURVEYED LINE.

Divisions.	Length of Division	Total distance from pond.
From bulkhead of conduit to pump well.....	4,850	
From pumping-well to reservoir on Walnut Hill	2,894	7,744
Length of reservoir.....	650	8,394
From reservoir to Main and Medford streets...	16,200	24,594
From junction Main and Medford streets to Chelsea Bridge	6,100	30,694
Length of bridge.....	3,221	33,915
From bridge to proposed reservoir, Hospital Hill.....	800	34,715

In constructing a dam at High Level, it is necessary to raise a road on either side of Weir Bridge, to a sufficient height to secure against flow, and to construct sluices at the outlet to carry away the surplus water. The area of the pond when raised, will be 351 acres, in addition to Bacon's mill-pond, and between this surface and six feet below it a supply of 600,000,000 gallons is obtained.

If the Low Level is adopted, the most favorable place for the locality for the tide-gates would be where the line of aqueduct will cross the Mystic River, it being at this point 100 feet in width.

CONDUIT.

To convey the water from the pond, a conduit is proposed, to be constructed of hydraulic brick masonry. It is to be circular, five feet internal diameter, and eight inches in thickness, and to have both an internal and external coating of hydraulic cement, in order to provide effectually against leakage or percolation.

This conduit to be carried a sufficient distance into the pond to admit of obtaining the water at a proper depth, where a bulkhead of hydraulic stone masonry is to be erected, fitted with suitable guard gates and strainers. The whole covered by a brick building to protect the work and insure against intrusion. At a distance of 70 feet from the northerly bank of Mystic River the conduit will enter a well, or pipe-chamber, fitted with gates, to admit of controlling the flow of water through the pipe, which from this point conveys the water to the pumping-station, and also to enable the wasting of the water, if necessary by a drain into Mystic River, which is also to be protected by double gates. The length of the brick conduit will be about 4,500 feet. From the pipe-chamber to the engine-house and feed-well will be required a pipe of thirty inches in diameter, passing under the bed of the river at a depth of six feet, between two lines of sheet piling about six feet apart, and rising level with the surface, which at this point it would be well to cover with a sheathing of oak plank, or with a bed of concrete. If the Low Level of the pond be adopted, the line of pipe will pass between the upper and lower gates erected to keep out the salt-water, and access to the pipe can be at any time had by closing both gates and pumping out the water. The length of pipe from pipe-chamber to feed-well, at pumping-station, is 350 feet. Should the High Level be adopted, a pile bridge will be required at this place, 100 feet long by 20 feet in width, to admit of convenient pass-way from the pumping-station to the pipe-chamber and line of conduit up to the pond.

As no water-power is obtainable sufficient to elevate water to the reservoir on Walnut Hill, steam-power will be required. It is proposed to locate the pumping-station at the base of Walnut Hill, near the south bank of Mystic River.

As the pumping of the water will form by far the largest item in the yearly expenditure, it is of the greatest importance that the most economical method of effecting this object be adopted. The "Worthington Pump" is mentioned in the report as having been in successful use in several places for obtaining a water-supply, and its performance is stated to be nearly or quite equal to that of the most approved engines, while its cost is much less. We can add our testimony in favor of this admirable apparatus, as it has met with universal approbation wherever used. By a peculiarity of its construction in combining two of these engines, termed "a pair," so that the valves of each are operated by the other, one opening as the other shuts the jar incident to their sudden closing is prevented, and the flow of the water through the forcing main is more nearly equalized. These pumps are in use at Cambridge, at Savannah, and at Greenwood Cemetery, and at a number of our large gas-works.

Two engines will be required at Charlestown, and the maximum duty of each will be to raise 2,000,000 gallons in twelve hours.

RESERVOIR AND DISTRIBUTION.

The reservoir to be located on Walnut Hill, will cover an area of nearly six acres. The proposed surface is 140 feet above mean high tide, which will insure a fair distribution over Charlestown and Chelsea, the highest graded street in the former being 99 feet above tide-water, and in the latter 105 feet.

EXTENSION TO CHELSEA.

The plans proposed contemplate an extension of the works to Chelsea, which would slightly increase the first cost. Surveys were made to determine the most feasible route. It is advised to conduct the mains from the intersection of Main and Medford streets on Charlestown Neck, through Medford street and Salem Turnpike to Chelsea Bridge, the pipe to be conveyed across the Mystic River upon a pile structure beside the Cochituate works. A reservoir will have to be constructed, and the hill near the Marine Hospital is spoken of as a favorable site.

INCOME FROM WATER-WORKS.

In estimating the probable income to be derived from the proposed works, the results obtained in other cities are used as a guide, and from the calculation it is believed the revenue will be sufficient to render the works self-supporting. In the following table a little more than half of the dwellings, stores, &c., are set down as water-takers.

ESTIMATED REVENUE TO BE DERIVED FROM WATER.

Av. Boston rents, 1858.	Classification of Water Tenants.	
11.46	1900 dwellings, at $8 50.....	16,150
8.03	215 markets, stores, shops, and offices, at $8...	1,720
30.38	50 saloons, restaurants, and hotels, at $12....	600
12.40	900 horses at $2. or 180 stables, at $10.....	1,800
6.00	825 horse power, steam-engines, at $5.....	4,125
	Manufactories, tanneries, and chemical works.	1,451
	15 bakeries, breweries, distilleries, and Gas Co.	
56.50	at $30.....	450
5.00	180 bathing-tubs and water-closets, at $5.....	900
	Building purposes.....	800
	Shipping.....	200
	City buildings.....	300
	U. S. Navy-Yard*.....	4,000
		$32,036

*As per estimate United States Constructing Engineer.

If to this sum ($32,036) be added the amounts now paid by Railroads..... 1,800
and by State's Prison..... 639
2,439

The income from Charlestown would be..... 34,475
City of Chelsea, population about three-fifths that of Charlestown, estimated income..... 20,685

Total Direct Income..... $55,160†

The saving to the Fire Department of these two cities will be no small item, and the reduction in the rates of insurance will be of some importance. The benefits annually accruing from the proposed works will be

1st. The direct income.....	55,160
2d. The saving to Fire Department.....	3,500
3d. The saving in cost of Insurance.....	15,000
	$73,660

These estimates are based upon the present population of the two cities, while the works are designed upon a scale presumed to be adequate for the next twenty or twenty-five years, allowing for an increase of population in the present ratio. The inhabitants of Charlestown now number 25,000, and those of Chelsea 15,000.

PURITY OF THE WATER.

A chemical examination of several samples of the water from Mystic Pond, was made by Dr. Hayes, who expressed the opinion that its quality was equal in every respect to that from Lake Cochituate, and admirably adapted for domestic purposes.

The proposed plan for supplying Charlestown with water has been opposed by some individuals, who held that the construction of the works would inflict a great injury to the navigation of the Mystic River, and that the importance of this reservoir of Charlestown Harbor is too momentous to be endangered by the dam which is contemplated. This objection, however, was not considered valid, for C. L. Stevenson, Esq., by order of the City Council of the city of Charlestown, made a careful examination of all the points likely to be affected, and arrived at the conclusion that the erection of a dam at the outlet of Mystic Pond will not be injurious either to Boston Harbor or to the Mystic River, but on the contrary, it may be constructed so as to be beneficial to both, by retaining the fresh water flow during such hours as is now proved detrimental, and thereby admitting more tide-water into the river, and using part of the fresh waters thus collected, at such times as experience will show them to be most valuable in increasing the value of the ebb current.

It is a matter of great moment to the inhabitants of Charlestown to be in possession of a valuable uninterrupted water-supply, and we hope soon to announce the consummation of this desirable work, and trust its benefits will be fully appreciated.

†Based upon the population, at Boston rates, the income would be $68,800.

In Jersey City, as appears from the Reports of the Water Commissioners for 1858, the annual revenue from 1,500,000 gallons per diem is upward of $50,000.

In Chicago, the where water is also pumped, the annual income for 1858, from 3,000,000 gallons per day, was $102,709.32.

In Cambridge, the revenue from 400,000 gallons per diem is about $12 000 per annum.

The quantity assumed as required for supplying the present population of Charlestown and Chelsea, at sixty gallons for each individual, would be about 2,500,000. The income, therefore, at Jersey City prices, would be $68,333; at Chicago rates, $85,092; at Cambridge rates, about $75,000.

A National Tribute to Gas.

Just as the last hours of the XXXVITH. Congress were expiring, a bill was introduced into the senate to charter the Metropolitan (opposition) gas-light company, as a choker to the regular Company now in operation in Washington, D. C.

Mr. Bright, of Indiana, addressed the senate for three "long, lingering hours" against the bill, consuming in the fact the last moments of the session in his gaseous soliloquy. The Washington Gas-Light Company has evidently driven a sharp bargain with Uncle Sam, who becomes restive on the subject, now that he has six desks less to light up, while the "odious monopoly" holds him to his original bargain. Who says now that Cotton is King? WE say that GAS IS KING—here, everywhere. It has ruled this country for seventy years, there is danger that it has destroyed it. See VOL I, p. 133 of this JOURNAL for the proof.

GAS ENGINEERS' AND SUPERINTENDENTS POCKET ALMANAC.—We have received from Messers Code, Hopper & Gratz a very neat and useful little almanac for 1861, bearing the above title. As it is distributed free, all that any one wishing to possess it has to do is to write to the proprietors at Philadelphia, and they will supply them, paying the postage too, we believe.

THE AMERICAN GAS-LIGHT JOURNAL is published on the 1st and 15th of every month and is specially devoted to

LIGHT, HEAT, WATER-SUPPLY, AND SEWERAGE.

Its purpose is to ascertain and make known all new discoveries in the science and economical application of LIGHT, and pro mote thereby the interests of companies and consumers; to encourage and aid the introduction of PURE WATER from Lakes and Rivers into Towns and Cities, and to improve the system of SEWERAGE, VENTILATION, and DRAINAGE everywhere.

Incidentally with these results, the business of all Gas and Steam Fitters and Plumbers; the erection of Gas-Works and Water-Works; the consumption of Coals, the manufacture and consumption of Coal-Oils, the manufacture of Gas-Pipe, Water-Pipe, Steam-Pipe, Gas Fixtures, Gas-Meters, Water-Meters, Retorts of iron and clay, and their varied apparatus; of Drain Pipes, Ventilating, Heating and Dredging Machines, will be increased immeasurably.

THERE ARE 20,000 CITIES AND TOWNS IN THE UNITED STATES, CAPABLE OF SUPPORTING GAS-WORKS, WHILE THERE ARE NOT 400 GAS-WORKS IN OPERATION IN THE WHOLE COUNTRY!!!

New works are now springing up, however, every week, and they will continue to increase rapidly hereafter.

Advertisers of Gas-Coals, Coal-Oil, Water, Steam, Sewerage and Ventilating apparatus, and of Iron and Brass manufactures, &c., will find the AMERICAN GAS-LIGHT JOURNAL the most desirable and efficient medium of any in the United States, going, as it does, direct to the parties interested in those subjects.

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THE
AMERICAN GAS-LIGHT JOURNAL.

PUBLISHED ON 1ST AND 15TH OF EVERY MONTH.

PROPRIETOR, JOHN B. MURRAY. } { EDITOR, C. ELTON BUCK.

FRIDAY, MARCH 15, 1861.

The numerous reports which came from the petroleum regions of Pennsylvania and Ohio a few years ago, respecting the immense oil discoveries, received at that time but little more attention from the business and manufacturing world, than to elicit a passing remark, or to be merely the subject of mention as an interesting circumstance. The information regarding the yield of the wells, and the vast number of springs discovered, was of so marvellous a character, and the reputed amount of oil pumped from single wells was so incredibly large, that doubts were cast upon the whole enterprise, and those who left our large cities to engage in prospecting for oil in those regions, were regarded as rather visionary in their ideas, and were deemed to be pursuing a phantom which would soon lead them into an unenviable plight.

Time, however, has demonstrated the value of the production of the petroleum regions; and instead of the supply failing, as was at first predicted, the reports of still larger yields, and still newer sources are being circulated, and the fruits of the enterprise amply verify the statements regarding the increased supply of oil. The local papers of western Pennsylvania, Ohio, Kentucky, and other states, are laden with items announcing new and valuable discoveries, and these new openings seem to inspire explorers with still greater zeal, and many new sources will doubtless be inaugurated. It is not strange that amid all the authenticated accounts of valuable openings, numerous exaggerated and untrue statements should likewise appear, and frauds be perpetrated by unscrupulous land owners desirous of realizing by swindling inexperienced operators. Of course many of the reports of enormous yields are bare falsehoods, issued by designing speculators to deceive the unwary; but notwithstanding this, we may regard the petroleum basins as sources of great wealth, and which promise to be productive of large revenue.

Thus far, the demand for the oil has been far in excess of the supply, and the rapidity with which it is forwarded is indicative of the energy of those engaged in raising it. A very large proportion of it is shipped to France and Germany, where it is largely employed in the manufacture of aniline, fuschine, and other brilliant colors for dying. It is principally used in this country as an illuminating agent and as a lubricator; for both of which purposes it is, after a slight rectification, admirably adapted. Already the greatly increased supply of this fluid is having a damaging effect upon other articles which have been relied on as artificial illuminating agents, and it is proper to suppose that it will eventually become the main reliance of all who desire a cheap, pleasant, and safe light, where gas is not used.

The popularity of petroleum and coal-oils as illuminators has seriously interfered with the whaling trade, and the statistics of that traffic show a remarkable falling off in the supply of whale oil, and a diminution in the number of vessels employed. In the year 1844, the total number of vessels engaged in whaling in the United States was 635, the aggregate tonnage being 200,485. In 1857 the number of vessels mas 655, aggregate tonnage 204,209. In 1861 the number of vessels has decreased to 514, aggregate tonnage 158,746. In 1858, 200 ships went into the North Pacific for whale-oil; whereas in 1861 less than 100 are expected to go. These figures exhibit a large decrease within the past four years, and this will probably continue. The diminution in the number of vessels is attributable in some measure to difficulties experienced by the whalers, owing to a decrease in "catch." The whales, it is said, have grown very wild and are constantly changing their position. This together with severe weather experienced in their usual latitudes have contributed to the disastrous result. But the most important cause of the falling off is undoubtedly the largely increased consumption of petroleum and coal-oils, and the inauguration of gas-works in towns where whale-oil was previously used as an illuminating agent.

If the statistics of the petroleum business could be accurately compiled, they would present a long array of figures representing the amount raised and forwarded to market, and would afford an evidence of its importance as an article of trade. Already it has diffused a spirit of life and energy into a before comparatively quiet region; it has swelled the population of villages, and projected new towns. The industrial arts have been largely stimulated, and the increased demand of steam-engines, pumps, barrels, and other implements required for raising the crude oil from the wells and preparing it for the market, has opened new fields for inventive genius, the consequence of which has been that many improved methods have been adopted for producing the oils, effecting an economy both in time and labor.

A truly reliable account of the geology of the petroleum regions is much needed. The *rationale* of the formation of the oil is not yet accurately defined to the unanimous satisfaction of scientific men; different theories being held in regard to this subject, as is the case with many others. The most natural supposition would be that it is a distillation of coals conducted in nature's laboratory, under modified conditions of heat and pressure. This is doubtless correct to some extent, as certain petroleums display such characteristics as to prove their production from bituminized plants; while at the same time other samples indicate their probable origin from animal tissue by certain unmistakable evidence. Many of the more recent discoveries of oil-wells, have occurred in places hundreds of miles from any known coal fields, and where it is not possible for coal to exist, owing to the peculiar geological character of the country. Thus oil has been discovered in many parts of Canada, far from the coal formations, and veins have been struck there which yield a most abundant supply. The able paper by Prof. Newberry, published on page 216 of this volume, presents some valuable information respecting the geology of a portion of the oil basins, as well as other interesting matter as regards the physical properties and uses of the oil. This subject will doubtless receive its due share of attention from geologists who contemplate personal visits to these interesting regions, and we will lay before our readers any valuable details which may come under our notice, touching this important subject.

GAS-MANUFACTURE—IS IT A MONOPOLY?

If the promises relating to this branch of business, which inaugurated the year 1861 should be entirely fulfilled, the term "odious monopoly" will be no longer applied, truthfully at least, to existing gas-light companies.

During the past year mutterings of dissatisfaction at the quality and price of the gas, were heard in various parts of the United States, especially in the larger cities of this and the neighboring states of Massachusetts and Connecticut, but with two or three exceptions the discontents have subsided with no practical results. The State of New York opened the door to fair competition in this business some years since, by the passage of a general Gas Act, approved February 17, 1848, which for the sake of the record, we may print hereafter.

Fortified by this Act, several opposition gas-light companies have been started in this state during the past eighteen months, but suitable considerations from the existing companies, have satisfied the disinterested agitators and reduced their so-called public spirit to a level with what is commonly known as a successful attempt to levy black-mail.

The most formidable and as yet the only successful exception to this remark, is the newly established Citizens' Gas-Light Company of Brooklyn, N. Y., whose career, though short, is thus far brilliant without a parallel. The Citizens' Gas-Light Company was organized by a number of residents of that city who considered themselves aggrieved by the course of the existing company. In a brief space of time, stock to the amount of $1,000,000 was taken by some six hundred subscribers, many of whom are among the first citizens in point of respectability and wealth, and on the 21st day of January, 1861, the retorts were fired up and gas delivered to consumers.

Of the merits of the complaints so loud and general on the part of the residents of Brooklyn against the old gas-light company, we know nothing; but it is a self evident fact that they must have been deemed by that community to be conclusive to justify and secure such startling results.

It is stated that the Citizens' Company dispose of more gas at this early day of its existence, than did the Manhattan of this city, in the sixth year of its business. The amount furnished per night is 100,000 feet, and the demand for it far exceeds the ability of the Company to supply pipe and meters. It has already on its register 800 meters; arrangements have been made for placing 2,500 in position by the first of next August; and at the present rate of progress, the number will reach 6,000 in January next. It is expected that, during the year, twenty miles of pipe additional will be laid, which will make thirty-five miles in all.

Some time since the Directors of the Brooklyn Academy of Music advertised for estimates to light the building with gas. The Citizens' Gas-Light Company sent in proposals in respectful terms, stating their rates. A proposition was also received from the old Company to the effect that *they would furnish gas five per cent. cheaper than any other company.* The Directors of the Academy considered this proposition in the light of a disrespect, and unanimously resolved to give the contract to the new company on the terms proposed. Work was immediately commenced in introducing the pipes, and the building is now illuminated with the gas of the new company. They have also contracted to light the new Marine Barracks at the U. S. Navy Yard.

It is not for us to comment on these facts specifically. We print them to call the attention of other companies to them and to remind powerful monopolies that the age has passed when a disregard of the private rights and personal feelings of their customers will be tolerated. It is said that the up-turning of the streets of Brooklyn in substituting the pipes of the new for those of the old company, are on a scale that rivals the excavations of ancient Nineveh, and the Citizens' Company must look to it now that they are among the regulars, that they do not grow saucy as they grow rich. We shall have something further to say on this subject in our next.

BOWDITCH ON COAL-GAS.

In this country it is a circumstance of rare occurrence for a clergyman to devote himself assiduously to the pursuit of a secular profession, while at the same time performing the functions of his ministerial office. In England, however, it is by no means uncommon to find clerical gentlemen industriously pursuing investigations in the fields of philosophy, while at the same time ministering to the spiritual wants of their parishes. The Rev. Mr. BOWDITCH is a type of this class, and although the incumbent of an important pastoral charge he finds time to spend in his laboratory, and to indite communications to various scientific serials.

On page 170 of this JOURNAL, and again on page 220, we noticed two processes of Mr. BOWDITCH, for the effectual purification of coal-gas from bi-sulphuret of carbon. He has lately published a treatise on this subject, in the form of a discourse delivered before certain directors and managers of gas-works in England, which contains a detailed exposition of the plans referred to, in which an account is given of the impurities existing in coal-gas; particular stress being laid upon the presence of bi-sulphuret of carbon, and its mischievous effects treated as a matter of very grave importance. On page 252 we referred to the oil of vitriol controversy, which a few years ago was the theme of numerous contributions to the scientific journals. Many eminent chemists were divided in their opinions on the subject, some holding to the belief that the combustion of bi-sulphuret of carbon contained in coal-gas produced free sulphuric acid, while others emphatically denied this assertion. The partisans of both sides of the question confirmed their respective opinions by experiments which were conclusive to themselves, but were equally impotent to compel those on the one side to conform to the views of the other. Mr. BOWDITCH quotes the evidence of Dr. LETHEBY on the Metropolitan gas-bill, to prove the vitiating effects of the combustion of bi-sulphuret of carbon, and to put emphasis on the amount of sulphuric acid generated in a given time.

Starting on this basis—that coal-gas is largely contaminated with bi-sulphuret of carbon—the principal aim of Mr. BOWDITCH seems to be to advocate the efficacy of his patented process of using common clay to effect the purification of gas from this compound, and in favor of this object, he adduces many ingenious arguments, which, however, require something more than mere assertion to obtain general assent. It is now about five years since the author first announced that every trace of this noxious impurity could be removed from gas by the use of clay. Very soon after this assertion was made, Mr. LEWIS THOMPSON, at the request of Mr. BOWDITCH, conducted a series of experiments for the purpose of ascertaining the value, if any, of the process; but after a faithful trial he came to the conclusion that clay as a purifying agent was entirely worthless, except for the removal of ammonia. The results of these experiments were published at the time, and were deemed by most persons to be conclusive. Notwithstanding these adverse opinions, Mr. BOWDITCH still clings to his former ideas on the subject, and is fully impressed with the value of his process. During the discourse, he presented before his audience several specimens of foul clay from purifiers, and burned gas which had been freed from the bi-sulphuret of carbon by his method of treatment.

A critical auditor might have desired a more satisfactory explanation of the chemical action of the clay in the purifiers, which we are told exerts its power by "breaking up" the sulphur compounds, and are left to infer that its reputed action is of a catalytic nature.

With a few exceptions the book is well written, and should be owned by all who desire a complete gas library. Among the expressions we take exception to, is a very incoherent definition of tar, which is said to be "a compound containing sulphur and nitrogen." Now although this is essentially true, the converse cannot be said to be equally so; for a number of incongruous substances could in such an event be denominated tar, and even gunpowder might be included in the same category. But seriously speaking, a definition should be given with great care, so as to render misconception impossible, and an oversight like this ought not to have occurred in a book written by an accurate chemist.

BUSINESS DEPARTMENT.

The purchaser of the Astoria, N. Y. gas-works not having fulfilled his contract they will be resold for his account to morrow as per advertisement in this JOURNAL.

Inventors are directed to the announcement on another page of the new Tariff of Patent Fees. By this modification Foreign Inventors (except Canadians,) are placed upon the same footing as our own, from which wise legislation we may expect a large increase of business. Our Patent Agent will devote especial attention to orders from abroad.

RE-ISSUED PATENTS.

In nine cases out of ten, it is observed, where patents are infringed by manufacturers, it is because such infringements are invited by defective specifications, and claims, which obscure the invention of the patentee, and afford ground for cavil, if not certainty of escape from punishment.

In such cases the remedy of a "Reissue" is nearly always successful in working a cure without resort to litigation. The patent law provides that when a patentee finds that his patent is partially or wholly inoperative to protect him from infringements of his invention, because of a defective specification and claims, he may apply to the patent office, to have it amended, and if there be good reason for so doing, the old specification and claims are replaced by new ones, the patent running on the same as if no exchange had occurred. The Patentee however can not recover under the amended or re-issued patent for any infringement prior to the alteration, a penalty inflicted on him for his neglect to make his invention plain to the public. The following letter speaks for itself.

OFFICE OF NEW YORK CAR AND STEAMBOAT GAS CO.
117 Fulton Street, New York, Feby. 13th 1861.

MR. F. C. TREADWELL, JR.

Patent Dep't AMERICAN GAS-LIGHT JOURNAL.

Dear Sir—It is due to you, as the result of your agency for this company, in obtaining a re-issue of our Patent for a Gas-Regulator to say, that as the Patent originally obtained was defective in specifications, and thereby invited infringements, I was reccommended to you to correct the matter.

THE re-issue is eminently satisfactory. I cannot conceive it possible that any infringement can be made with impunity, and I have information that those who had infringed before the re-issue, are now no longer manufacturing. Respectfully Yours,

CHARLES STARR, Prest. of N. Y. Car & S. B. G. Co.

The Sterling Coal.

The well known Sterling Coal, Messrs. F. Butts & Co., proprietors, is *par excellence*, the American Gas-Coal having taken the lead this season among the Gas-Light Companies. Contracts for over sixty thousand dollars are already signed, and the proprietors anticipate their sales in this State alone will reach 50,000 tons during the season. The business of the Sterling Coal never approached the extent in sales reached this year. Before the season is over it will far outstrip that of any other coal miners in this country.

CORRESPONDENCE.

TO PREVENT CORROSION OF IRON PIPES.

PHILADELPHIA, 2d Mo. 26, 1861.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL:

Respected Friend:—There is one subject properly belonging to your JOURNAL, that we, and we presume many other of your readers would like well to have more information upon, *i. e.*: The real value of any application yet used to prevent the corrosion of iron water-pipes; also the composition and mode of applying the best yet tried.

To be of much practical benefit, the coating material must be quite cheap and easily applied, or it will never be used.

Can you not give us an article in the GAS-LIGHT JOURNAL that will enlighten us who make pipes, as well as those who use them? Very respectfully,

R. D. WOOD & Co.

THE PALMETTO GAS-LIGHT COMPANY.

CHARLESTON, S. C., March 3, 1861.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL:

My number of your JOURNAL of Feb. 15th has not come to hand. You will please not forget me in future, as I should exceedingly regret the loss of a single number. You will also have the kindness to send me the missing number by next mail if convenient, and oblige

Most respectfully yours, &c.,

B. P BRUNNER,
Engineer Charleston Gas-Light Company.

[We print the above letter more for the purpose of presenting to our readers an engraving of the Palmetto flag which adorns it, than for any other reason. There have been no secessions from our ranks in any quarter.

We are not advised of the yield of gas from the Palmetto Tree, but should think it may not be inconsiderable.—ED.]

BIRMINGHAM CT. WATER-WORKS.

BIRMINGHAM CT. Feb. 14, 1861.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL:

Sir: In your issue of the 1st inst., in what purports to be a communication from myself respecting the "Works of the Birmingham Water Co.," I find several errors—of the writer or printer—which it may be worth while for you to correct. The article was hastily written in connection with answers to certain questions contained in your circular, and was designed to supply information not called for directly, by the questions.

For the use of 25 fire-hydrants the Borough is to pay the water company $500 per annum, instead of "$5 each per annum," as you have it. "At the highest point in the village the hydrants will throw water over the highest buildings, through a 1¼ inch nozzle." and not as you have printed, "through a ¼ inch nozzle."

The connections at the ends of the main pipe, across the bed of the Naugatuck River, were made by means of "*dam-ing*," and pumping out the water. You have printed "*drawing*" instead of "dam-ing."

JOHN L. HOWE.

[The errors in the original letter were the result of the illegibility of the words, which we perused with great care in the MSS. ED.]

A TRIBUTE TO JOHN MALAM.

KINGS LYNN, ENGLAND, GAS-WORKS, 20th Nov., 1860.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL:

I am a subscriber to your JOURNAL—through an intimate friend of mine, Mr. J. Cowan of Blaydon Burn near Newcastle-on-Tyne—to which I wish every possible success. I perceive by your JOURNAL you notice all publications connected with Gas; but there is one work—Peckston's *Theory and Practice of Gas-Lighting*, pub-

lished in 1819—well worth your notice if you can obtain a copy. You will perceive by it that the *Father* of Gas-Lighting, Mr. Peckston and his brother-in-law, Mr. John Malam, were well up in the business they advocated in their day, and I make bold to say that had Mr. Malam lived he would have had his right place assigned him. In the centre of the group of worthies published as a frontispiece to Vol. 2 of the *London Gas Journal*. I became acquainted with him in 1832, and in his employ in midsummer 1834, when illness had unfortunately began to develop itself, to which he ultimately succumbed. Apologizing for the liberty taken, I remain, Sir,

Yours very respectfully,

SAMPSON ALMOND.

N. B.—You most likely have the whole of the *London Gas Journal*. If so, in Vol. 1, pages 116 and 117 you will see Mr. Malam's name in connection with gas-meters, and in many other places.

THE WATER-WORKS OF NASHVILLE, TENN.

In reply to your esteemed favor, I report—We employ two steam engines for pumping the water in our reservoirs; one is 24½ inch cylinder and 8 feet of stroke, and drives two perpendicular pumps,—the cylinder of one is 16 inches, and the other is 15 inches. The other engine is 13½ inch cylinder and 5 feet stroke, and drives two pumps which lie on an inclined plane of an angle of forty-five degrees; both engines are high pressure. I will forward you my last report in a few days, giving more of the particulars of pipes, fire-plugs, &c. We have no reservoir; our pipes are laid to the river, and the water is forced up by steam power. I will also forward you a copy of our directory which may be interesting. You will pardon me for not complying with your request sooner, as I was in your city when your first communication was received, and on my return our engineer failed to hand it over until a few days ago. I will also send you a copy of our city laws, which will be out of press in a few days, which will give you our charges for every description of business and buildings. I should be glad to give you any further information in my power

Yours, Respectfully,

JOHN M. SEABURY.

Superintendent Nashville Water Works.

[We thank Mr. Seabury for his attention; all of his favors have been received.—ED.]

NIAGARA FALLS, N. Y., GAS-LIGHT CO.

NIAGARA FALLS, N. Y., February 22, 1861.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL:

Never having seen any notice of our works except of a general character, I herewith send you a brief outline of the formation of our company and the erection of our works. There are some things about it unusual. You can make such use of it as you please.

Yours,

T. G. HULETT,

Sup't N. F. Gas-Co., N. Falls.

The Niagara Falls, N. Y., Gas-Light Co. was organized on the 21st day of December, 1859, with a capital of $20,000. In six days thereafter $12,000 of the stock was taken, and the ground broken for the erection of the works on the first day of January, 1860. In 97 days thereafter the works were in working order, with ¾ of a mile of mains laid. On the 7th day of May there were lighted 500 burners at the Cataract House. During the excavation of the tank-pit and laying the masonry, the thermometer frequently stood below zero, but by roofing the pit on a level with the surface, and putting in stoves the temperature was kept at about 50 degrees, and thus the work was not suspended from the commencement till its completion.

Since September last we have extended our mains to Suspension Bridge, 2 miles, and now light the two villages of Niagara—American and Canadian. The capacity of the works are as follows: 2 benches of retorts, one of three and the other of two—the latter an arch to each so as to use them singly; one gas-holder 19,000 feet capacity; have run 3 retorts from the start; have 170 meters set. Summer consumption greater than winter, in consequence of the great accession of visitors in our large and numerous hotels. Least consumption, month of April; largest consumption in August; average consumption about 7000, c.f. per day; average yield of gas 3¾ feet per lb. of coal; works built by the Co., under the supervision of a building committee; engineer Geo. W. Parsons, Esq., Rochester, N. Y. Gas-Holder made by Siddons & Co., Rochester; customer meters from Joseph Lennig of Phila., and D. McDonald & Co., Albany, N. Y. Iron retorts from Buffalo Gas-Light Co. Mains (2 to 4 inch) from Eddy & Bingham, Buffalo, N. Y.

Coal used, Sterling and Ormsby, mixed half and half.

The buildings are of the most substantial kind, of brick, with slate roofing. The grounds are laid out in the most beautiful manner into flower and strawberry beds, and are a great resort for strangers visiting the falls. Every gas-engineer and superintendent of gas-works who visits the falls, of course visit our gas-works, and they invariably pronounce them the Model Works of the continent.

The works are situated on the edge of the high bluff of the Niagara River, and all accumulations that make gas-works unsightly and offensive, pass off under ground, into the gulf of the mighty cataract. Our stock is not in market.

Report of the N. Y. State Inspector of Gas-Meters to the Legislature.

One or two of the legislative wheel-horses became rather restive in their traces early in the session, and seeing no other bugbear in the road, began kicking and rearing at the gas-lights, which we observe attract their attention particularly about *dividend time*. They think, no doubt, that the gas-companies are flush about these days, and need a hint to "pay up" or be "put down."

So the legislature, after an ineffectual attempt to excite the "injured consumers," called in the State Inspector for information of the accuracy of the meters, and here it is. The brevity of the Report is sufficiently irritating to those philanthropists, to say nothing of the dead-lock which it puts upon their disinterested movements. The report is a clincher:

STATE OF NEW YORK. No. 61.

IN ASSEMBLY, Feb. 7, 1861.

COMMUNICATION FROM THE STATE INSPECTOR OF GAS-METERS, IN ANSWER TO A RESOLUTION OF THE ASSEMBLY, RELATIVE TO GAS METERS.

To the Hon. the Assembly of the State of New York:

In compliance with a resolution of your honorable body, requesting a report on the various modes of selling gas in this State, and my opinion as to what legislation is necessary as to the measurement of gas, and the indication of gas-meters, for the protection of gas consumers, I have the honor to

REPORT:

That all gas sold in this State, so far as my information extends, is sold by meter, the indexes showing the number of "cubic feet" which passes through them; excepting such cases only (as in street lamps) where meters cannot conveniently be attached, and where, as in the Western part of the State, natural gas issues from the earth, and is used for illuminating purposes. In such cases, special contracts are made, based upon the probable consumption.

The price charged for gas in this State, depends upon the cost of production and distribution, and the quantity consumed, and varies from two dollars and fifty cents to seven dollars per one thousand cubic feet.

Companies furnishing rosin gas, are selling the same at three dollars and fifty cents per "standard" of five hundred cubic feet, or at the rate of seven dollars per one thousand feet.

Coal-gas is not sold in the State, so far as I am informed, at a price exceeding four dollars per thousand feet.

Upon my appointment to this office, I submitted to Prof. Gibbs, of the Free Academy, Prof. Joy, of Columbia College, and Prof. Torrey, of the United States Assay office, a "standard cubic foot measure," which had been made in England, and tested by gentlemen of eminent scientific attainments there. The gentlemen I have named tested this measure, repeatedly and carefully, with distilled water, prepared by themselves, using the scales and weights of the Assay office, which are used in weighing gold submitted for analysis. They pronounced the measure to be "practically correct."

By this measure I have tested 29,227 meters, and 44 proving apparatus, used by the gas companies in the State, since I entered upon the duties of this office.

The above meters were submitted by the manufacturers, for inspection, before being delivered to the gas companies.

There has been a very large number of meters sent to this office, with complaints of overcharges for gas, but in nearly every instance, the meters have been found correct, or registering slightly in favor of the consumer. When found registering against the consumer, the amount has been so very small, as not to account for the apparent overcharge.

I have found complaints, in most cases, to arise from defective fixtures and burners, or from not properly regulating the flow of gas at the meter. In one instance, at a large manufacturing establishment in this city, I found a leakage of two thousand feet per day.

These defects can be remedied, only by proper attention on the part of the consumer.

I believe the act which was passed on the 14th of April, 1859, provides all the legislation which is necessary, respecting the measurement of gas and the indication of gas-meters. I cannot conceive it possible to give to gas consumers any greater protection than that act affords.

I regard the gas-meter, as at present constructed, as fair and correct a measure as any other used in commerce; and if accurately adjusted, when put in use, it cannot possibly register against the consumer.

When out of order, a meter may, and often does, allow a portion of the gas to pass through it unregistered, but in no case can it indicate a greater quantity than is actually measured.

The above report is most respectfully submitted.

GEO. H. KITCHEN,

Inspector of Gas meters for the State of New York.

New York, Feb. 4, 1861.

REPORTS OF GAS-LIGHT COMPANIES.

WILLIAMSPORT, PA.

In conformity with the by-laws of said Co., the Treasurer hereby presents to the managers an account of the receipts and expenditures up to 31st December, 1860.

	Dr.	
To Amount of receipts for Gas		$9 505 32
" " other receipts		2,053 66
		$11,558 98
	Cr.	
By sundry payments		$8,740 60
" Cash and bills on hand		2,818 38
		$11,558 98

The above is a very unsatisfactory report, inasmuch as it gives no data by which the results of the business can be ascertained. We give it, however, as we received it.

JOHNSTOWN PA. WATER AND GAS-COMPANY,

FROM JUNE 1ST, 1858, TO JUNE 1ST, 1859.

RECEIPTS.

Cash Balance on hand		218 37
" Received for Gas		4.943 82
" " Lime		17 95
" " Meter rents		260 12
" " Services		163 25
" " Coke		49 81
" " Stock		12.982 42
		$18 635 74

EXPENDITURES.

Cash paid for Expenses		57 07
" " Coal		845 63
" " Supt. and Firemen		932 88
" " Lime		71 74
" " Meters		506 95
" " Services		366 45
" " Retorts		386 16
" " Repairs		53 09
" " Street Mains		57 27
" " Taxes		62 24
" " Improvements		361 22
" " L. R. Titus		11.965 82
" " Real Estate		1 000 00
" Balance on hand		1.969 22
		$18.635 74

FROM JUNE 1ST, 1859, TO JUNE 1ST, 1860.

RECEIPTS.

Cash Balance on hand		1.969 22
" Received for Gas		5.389 33
" " Meter rents		404 91
" " Service		102 80
" " Construction		561 30
		$8.427 55

EXPENDITURES.

Cash paid for Coal			1.262 30
" " Retorts			9:0 08
" " Street Mains			248 77
" " Supt. and Firemen			1.273 36
" " Meters			513 85
" " Service			168 05
" " Repairs			37 22
" " Expenses			55 17
" " Improvements			94 90
" " Lime			72 42
" " Taxes			78 78
" " Purifying House			161 43
" " Division No. 1	1 233		
" " " " 2	1.233		2 466 00
" on hand			995 22
			$8.427 55

CANTON, O.—This gas-light company have declared a dividend of six per cent., payable in cash, at the office of the company on and after April 18.

PROFESSOR WAY'S ELECTRIC LIGHT.

The passengers over the Hungerford Suspension Bridge, and on the Lambeth strand, were enabled, a few weeks since, to witness the effect of the electric light invented by Professor Way; the brilliant flood from which issued from a window on the North side of the river, bringing into startling relief every object it encountered. This light differs in character from that produced through electrical agency by means of charcoal points, and from the lime-light, principally in its great volume, appearing, not as a single vivid point, but as a focus of considerable dimensions. It is of an intense white color, with a tinge of green. The effect of its intermission was very striking; the glare of broad daylight being suddenly exchanged for darkness, rendered visible by the moon looking unusually dim and red by the effect of the contrast. Proceeding to the *locale* whence issued the illumination, the arrangements were kindly explained by Mr. Thomas Evans, who had charge of the apparatus, and subsequently by the Professor himself, and we are thus enabled to afford our readers some information respecting the arrangements for producing this light, concerning which little is generally known. A fine stream of mercury, which can be regulated according to the battery power and the volume of light required, passes from an upper into a lower reservoir, and is made to conduct the electric current, by means of which it becomes intensely heated and partly dissipated in vapor. The vaporized mercury becomes subsequently condensed, and proceeds to the lower reservoir, whence it again issues, when the upper reservoir is exhausted and the apparatus reversed. The evolution of light by the passage of the electricity through the fluid conductor appears, however, to be due, not alone to the heating effect, but also, as in the case of the light from charcoal points, to the intensity of the current employed. This fact, which is of interest in explaining the phenomenon which takes place, was pointed out to us by Mr. Fuller, the electrician of the Silvertown Telegraph Cable Works, and was confirmed by an examination of the battery employed, which, contrary to our anticipation, was an *intensity* rather than a *quantity*, or heating arrangement. The employment of the mercury stream, as a conductor, fulfills conditions which would probably be wanting in any other substance which could be used for the purpose of obtaining light by similar means. Thus, although some illuminating effect may be produced by heating platinum wire to whiteness by a quantity current, this conductor is deficient in those characters which enable us, by means of tension electricity, to obtain light from charcoal points, interrupted metallic conductors, and the mercury stream of Professor Way. If, on the other hand, we interrupt the wire, we obtain the electric spark which appears in making and breaking contact with mercury; but we fail to produce the heating effect upon the conductor, to which the illuminating power is partly due in the arrangement under notice. It is obvious, moreover, that the constant renewal of the conductor renders it possible to employ a current of any degree of power, and which would be otherwise inadmissible. The vertical mercury stream must be considered as composed of a multitude of conducting globules separated by an imperceptible interval, and thus affording the vivid spark which occurs in making and breaking contact with the metal. This hypothesis affords an explanation of the fact, that an equal illuminating effect cannot be obtained with a *horizontal* stream of mercury, although the latter may be heated to an equal degree. It should be observed, that the apparatus of Prof. Way, which may probably before long be employed in light-houses and for signalling, is rendered air-tight, so as to preclude the possibility of any injurious effect arising from escape of the vaporized mercury.—*London Engineer.*

GENEVA, N. Y.—Dungan, Cartwright & Co., builders of the gas-works, which are well spoken of. The iron retorts are from Robt. Campbell, (now R. A. Brick.) New York. Mount Carbon and Beaver Meadow Coal, in the proportion of ⅔ and ⅓, average cost being $5.02½ per 2,000, delivered.

MADISON, IND.—This is one of John Lockwood's gas-works, and the stock was too highly watered for profit. John did good work, but wanted to make too much, which proved unprofitable. Ashcraft's iron retorts used, with Colton, Code & Co.'s and some London meters—probably Glover's. Pittsburg coal is delivered at works at 11 cents per bushel of 76 lbs.

ANSWERS TO CORRESPONDENTS.

M. N. G., of Ky.—*A soap is a regular chemical combination of a fatty acid with a base, usually soda or potassa. The ordinary fats are composed of acids combined with glycerin, which is the oxide of a hypothetical radical glyceryl. The affinity of soda or potassa for these acids being stronger than that of the glycerin, when placed in contact, the glycerin is eliminated, and the acids enter into a new combination with the alkaline base, forming soap. Coal oils are totally different in their chemical properties from the fats, containing no oxygen. Not being compounds of an acid with a base, they cannot be saponified.*

J. B. U., of Ohio.—*Any authentic information you can give us with regard to the oil wells of Ohio, will be gladly received. We will be pleased to hear from you at any time, and if you meet with any interesting results, we will be glad to have an account for publication.*

G. I. R., of Pa—*We will notify you when we have more leisure.*

O. L., of Mass.—*You have arrived at a correct conclusion.*

E. B. D., of Va.—*We can but reiterate our frequently expressed opinion on this subject. Try them faithfully, and you will wonder you have adhered to iron retorts as long as you have. We can advise you to make the change without the slightest hesitancy.*

C. E. I., of Ga.—*Gas can be made from any woody fibre, or animal or vegetable matter. Crushed sugar cane stalks make an excellent material, and the gas produced from them is of an excellent quality. Cotton seed is used as a gas material in some Southern States and is said to produce an illuminator of great power and purity.*

Carbon, of Pa.—*Kopp, the author of the series of papers we have been publishing, on the extraction of coloring matter from coal-tar, is the associate of Liebig, in the annual publication of the "Progress of Chemistry" The English translation was discontinued a few years ago, owing to want of patronage. The German edition can be obtained at any foreign scientific book-store.*

A. L. D., of Cal.—*Furnish us with the data, and we will inform you of the probable result of the projected enterprise.*

W. E. D., of N. Y.—*It is of sufficient importance to warrant the expense of an elaborate investigation, which you will not regret having authorized.*

E. P. S. of Ind.—*You will find a description of the carcel lamp, fully illustrated, in Ronald's & Richardson's Technology, p. 496.*

A. T. of Minn.—*We think your town is sufficiently large to support gas-works, if properly managed. Our advertising columns will notify you of many excellent contractors, who will undertake the work on favorable terms, and we advise you to agitate the subject among your fellow townsmen, until a foundation is laid upon which to work.*

B. J. H. of Ark.—*The burner generally used, is the five foot fish-tail, which is probably best adapted for ordinary purposes. The street lamps of New York city are furnished with three foot fishtail burners.*

HISTORY OF COAL OILS.

The production of oil from coal and petroleum, or rock oil, having passed through its experimental stages and become an article of commerce, and having assumed a form of utility which commends its use in all localities where gas is not attainable, as well from its illuminating properties as its economy, and as it bids fair to compete successfully with the production of burning fluid and camphene, and finally to, perhaps, exterminate their manufacture, we devote some space to a consideration of its history and production. The first attempt to introduce coal oil practically to the people of the United States was made by the Kerosene Oil Company, of this city, in 1857, and their efforts in this direction were quickly seconded by those of the Carbon Oil Company, in December of the same year, by the first introduction of oil made from petroleum, for burning in the coal oil lamps. The beginning thus made has been steadily followed up through some trying fluctuations and depressions, growing partly out of the inferior quality produced, and partly from the fact that the demand speedily outran the supply; and the public discontinued its use in the Fall and Winter of 1859, from its scarcity, poor quality and high price. Our own coals are not well adapted to the production of coal oil, as the yield of oil is not sufficient to make manufacturing from them profitable, as compared with the greater yield and superior quality of foreign coal—especially that obtained from Scotland and New Brunswick. But this defect nature has abundantly made up to us, in our great deposit of natural oil, which we shall presently notice. The yield of crude oil per ton—of native and foreign coal—is given below, and, in addition to the greater quantity obtained, the imported coal has the advantage of producing an oil much lighter in specific gravity: hence much superior for illuminating purposes.

England—Derbyshire	82	gallons per ton.
Scotland—Boghead	120	" "
" Lesmahago	96	" "
New Brunswick—Albert Coal	110	" "
American—Pittsburg	49	" "
" Kanawha	71	" "
" Falling Rock	80	" "
" Cashocton	74	" "
" Breckinridge	100	" "
" Petroleum Springs	—	" "

Alabama, Tennessee, Pennsylvania, Virginia, Ohio, Kentucky, Texas, Canada and California, produce from 60 to 95 per cent. of the illuminating oil. The Breckinridge shows the most favorably among American coals; yet the most satisfactory results are obtained from the Scotch Boghead coal. These coals also yield oils of heavy gravity, and by some it is claimed that they possess superior lubricating properties; but this is a point not yet satisfactorily established. Doubtless they are useful to some extent as lubricators, mixed with animal oils, but for such purposes their value is but small. The heavy oils also contain a large per centage of paraffine, which is used quite extensively and successfully in the manufacture of so-called Paraffine candles, of fair quality, very little inferior to sperm.

The discovery of the great oil deposit of Pennsylvania has given a great impetus to the production of these oils and the certainty that these deposits are of vast extent causes the prospective business in this class of oils to loom up very largely. The first petroleum oil, known as "carbon oil," was introduced into this city in 1857, and was obtained from a salt well at Tarentum, on the Alleghany river, Pa., and was introduced to the public by a gentleman now connected with the Carbon Oil Company.

The great demand which immediately followed its introduction, and the remunerative prices obtained, stimulated further search for these oils, and led to the development of the great oil deposit, of which almost fabulous accounts have from time to time appeared in the papers of the day. This deposit is of great extent, and reaches in a direction nearly north and south from Lake Erie, through the States of New York, Pennsylvania, Ohio, Virginia, Kentucky, Tennessee, Alabama and Florida, and also exists in abundance in Canada West. Its principal development in Canada is at a place called Eniskellen—about 20 miles from Port Sabina. But, although existing in very great abundance in Canada, its commercial value from that section is small, owing to the unconquerable and offensive odor with which it is impregnated. We give below the number of square miles of the great oil deposit as far as yet determined, although it doubtless extends over a much greater area:

Alabama	1,300	square miles.
Tennessee	1,000	"
Kentucky	2,000	"
Virginia	1,800	"
Ohio	1,500	"
Pennsylvania	2,500	"
Florida	500	"
Total	10,600	square miles.

This Petroleum also exists abundantly in Texas, although entirely undeveloped in that State; and on our Pacific coast, in California, there are immense deposits of oil and bitumen, which have as yet attracted but little attention. A belt of this oil deposit, of great extent, also exists west of the Mississippi, but how extensive is yet undefined. It is also found in Illinois, and doubtless will yet be discovered in many other localities in the United States. We are thus particular in giving some idea of the extent of the deposits of this material, as we think it is ere long destined to form a very important article of commerce, both for domestic use and for export.

This rock oil is peculiar in its chemical combinations and bases, and will doubtless yet be applied to a great variety of important uses; but our purpose is to give an idea of its present or immediate importance as an article of trade and manufacture.

As to the origin of this oil, opinions differ; the popular idea is that it oozes from coal, or has been expelled from it by heat or pressure; but many facts bear against this theory, and the probable truth is, that it is an independent or original deposit, having no connection with coal, but closely allied to it—although sometimes found in geological formations which absolutely forbid the existence of coal—as in Canada West.

But our purpose is not to discuss this, but to give its present dimensions and probable expansions, with the prices it is likely to command in the future.

The production of petroleum, which occurs at the present time mainly along Oil Creek, and its tributaries in Pennsylvania, in the vicinity of Mecca, Ohio, and Parkersburg, Virginia, may be stated as follows:

January, 1860	30	barrels per day.
July "	500	" "
December "	1,600	" "

This oil has commanded an average price in its crude state, at the wells, of 18 cents per gallon. At the present time it is selling for about 23 cents, although it has been sold during the past Summer as low as 10 cents per gallon. But as we estimate the yield for July, 1861, at 5,000 barrels, of 40 gallons each, per day, it is probable that the price will decline to a lower point than it has yet reached. The manufacture and sale of oil, refined from coal and petroleum, which has already had a marked effect on the whaling interest and the production of fluid, may be stated as follows: In 1858, 100 barrels per day, at an average price of 80 cents per gallon; in 1859, 300 barrels per day, at an average price of 1.00; in 1860, 1,500 barrels per day, at an average price of 70. Its production before the close of 1861 will doubtless reach 5,000 barrels, or 200,000 gallons per day, or upwards, at an average price below rather than above 50 cents per gallon. As it is an oil perfectly free from danger of explosion, gives a light fully equal to gas, and is more than three times as lasting as fluid, it is very probable that, when these low prices are reached, whales may have some rest, and the camphene operators turn their attention to the manufacture of rock oil. Much capital has been invested in the manufacture of coal oil; but as the rock oil can be pumped so much more cheaply than the oil can be extracted from coal by the agency of heat, the coal oil manufacturers will have eventually to give over the field to the rock oil. We close with a brief description of the oil wells: These are borings through the solid rock of from three to six inches in diameter, and of various depths, from fifty to five hundred feet, the drill being kept in operation till a vein of oil is "struck," or the attempt abandoned. If successful, the hole is tubed, and a pump, worked by hand or the feet, or steam, put in operation, and rude tanks erected to contain and separate the oil and water which flow from the pump. The wells in successful operation number about 200, principally in Pennsylvania, Virginia and Ohio, and the total number in operation, and in course of construction at the present time, is about 2,500. The average cost of boring and fitting up is about $1,200, and the average production of oil from the successful wells is about eight barrels, or three hundred and twenty gallons per day each.—*Shipping List.*

MANUFACTURE OF MACHINERY FOR OIL BORING AND REFINING IN PITTSBURG.—Our neighbor of the *Chronicle*, by a special reporter, has collected statistics respecting this species of manufactures in our city, which exhibit the following astonishing results: Within the past year over half a million of dollars have been expended here for steam engines, boilers, tubing, etc., for the oil district; seventeen thousand barrels of crude oil have been received, and $219,500 worth of purified oil disposed of: $176,976 were received for steam-engines and boilers, and $178,002 for tubing and drills. The cost of an engine has averaged less than $300, but never averages above that sum. The Cleveland and Pittsburg Railroad have brought in fifty barrels a day for four months, of which one hundred barrels a week came from Smith's Ferry. The Fort Wayne brings in a car load a day now, and has been doing so for two months. Total received by this line thus far, three thousand three hundred barrels. The Allegheny Valley Road brought down from the Franklin district three thousand five hundred barrels within the last year. By the Allegheny river steamers we have but four thousand four hundred and thirty-four barrels. This we feel assured is far under the mark. It was consigned to Clark & Co., who sent the whole to the firm of Scheiffelin & Bro., New York. By the Ohio, three thousand two hundred barrels were received within the last four months. It came principally from Washington and Noble counties. Total amount reported, sixteen thousand nine hundred and thirty-four barrels. Total value, at $12 per barrel, the price paid for it in a crude state, $232,208. There are several refineries going up in the two cities, which will be ready for operation in a couple of weeks. Total number reported, six. Amount of oil sold during the year, eight thousand seven hundred barrels. Amount realized, at $25 per barrel, $219,506. Total cost of steam-engines, boilers, machinery, tools, rope, &c., &c., purchased here for oil operations during the last twelve months, $527,720. Value of refined oil sold by our refiners, $219,500. Value of oil received here by railroad and river, $203,208. This, we may add, is exclusive of the business done in coal oil.—*Pittsburg Post.*

PATENTS.

Inventors are informed that Patents are procured at the Rooms of the AMERICAN GAS-LIGHT JOURNAL, through F. C. TREADWELL, Jr., Esq., an experienced Patent Agent and Expert, in the United States, and in all other countries where Patent Laws are in force.

UNITED STATES.

310.—Thomas Hansbrow, of Sacramento, Cal., for an Improvement in Pumps:

I claim the arrangement of the inclined valves, f, seat, g, and suction pipe, H, above and with the cylinder, A, and piston, G, in combination with the sliding plate, F, and oscillating armed lever receiving piece, D, in the manner and for the purposes shown and described.

318.—N. S. Manross, of Forrestville, Conn., for an Improved Apparatus for Lighting and Extinguishing Gas Lights:

I claim, first, The employment, for the purpose of lighting gas at any desired hour, of a hydrogen and platinum kindling apparatus (Dobereiner's Lamp) and clock movement, combined and operating substantially as described.

Second, So constructing and applying the cam, T, or its equivalent, and so applying the mechanism through which it acts on the hydrogen valve and illuminating gas valve, that the hydrogen valve, after the ignition of the illuminating gas has been affected, will be closed, and the illuminating gas valve only left open, substantially as described.

Third, Providing for the protection of the platinum by means of an automatically opening and closing box, K, substantially as described.

Fourth, The rotating dial, W', with its two adjustable pointers and two attached trippers, applied and operating substantially as described.

348.—L. P. Jenks, of Boston, Mass., assignor to W. S. Murray, of New York City, for an Improvement in Filters:

I claim, in cases of a conoidal form, as described, the combination and arrangement of one or more bunches of fibers placed in a perforated groove or grooves, and alternately compressed or expanded, for the purpose of filtrating water or other liquids, all as set forth.

355.—S. B. H. Vance (assignor to Mitchell, Vance & Co.) of New York City, for an Improved Electrical Apparatus for Lighting Gas;

I claim, first, The employment or use of a portable electric machine, D, such as described, in place of the lamp, candle, taper, or other match generally used for the purpose of lighting gas.

Second, The arrangement of the cups, a, or their equivalents, to operate in combination with the pointed hooks, B, burners, A, and with the electric machine, D, in the manner and for the purpose specified.

Third, Giving to a portion of the rod, b, the form of a spiral spring, as and for the purpose set forth.

[The object of this invention is to arrange each burner by means of a cup, hook or other device, in such a manner that a portable electric machine can be used for lighting the gas emanating from each burner separately, or in other words, so that the portable electric machine can be used in place of the lamp, wax taper or other match generally used for lighting gas.]

361.—P. Anderson, of Norwich, N. Y., for an Improvement in Water Elevators:

I claim the employment in combination with the buckets, windlass and windlass shaft of a well of the self-acting device, composed of the oscillating double armed lever, K, sliding toothed collar, J, and oscillating lever, M, with its spring, L, in the manner shown and described.

373.—C. H. Dumbrack, of Jacksonville, Ill., for an Improved Water Elevator:

I claim the adjustable drum, D, arranged with the permanent wheel, C, substantially as shown, to admit the facile adjustment of the rope, E, to suit the hight of the water in the well.

[The object of this invention is to obtain a simple and efficient machine for elevating water from wells for domestic purposes—one that may be manipulated with facility, and not liable to get out of repair. The invention consists in the employment or use of valvular buckets, with an adjustable windlass and movable spouts, whereby the desired end is attained.]

414.—Ebenezer Tuttle, of Canaan, Maine, for an Improvement in Water Wheels:

I claim the combination of the horizontal, adjustable plates, f, with the buckets, c, and gate, F, of a water wheel, substantially in the manner and for the purpose shown and described.

[This invention consists in the employment of a cylindrical gate, applied to the wheel so as to encompass and revolve with it, and having a series of horizontal projections attached to its lower end, so as to fit between the buckets of the wheel and form horizontal partitions therein: all being so arranged that, as the gate is actuated or adjusted to admit water to the wheel, the partition plates will also be adjusted, and the capacity of the buckets varied according to the volume of water admitted. By this means a greater or less amount of power may be obtained from the wheel without an unnecessary expenditure of water.]

447.—L. P. Garner, of Ashland, Pa., for an Improved Machine for Breaking Coal:

I claim the combination of the toothed rotating face plate, C, and toothed cylinder or roll, H, the whole constructed and operating as described, for the purpose set forth.

453.—B. F. Hebard, of Neponset, Mass., for an Improvement in Burning Fluid Compositions:

I claim the composition of fusil oil, kerosene and spirits of turpentine, and its combination with a perfuming essential oil, as set forth.

460.—J. P. Kenyon, of Brooklyn, N. Y., for an Improvement in Hydrants:

I claim, first, The arrangement of the chamber, J, central tube, L, shoulder, o, or its equivalent, with the plunger, H, provided with the chamber, K, packing, M, and tube, G, the latter being in communication with the chamber, J, tube, F, and spout, D, substantially as and for the purpose set forth.

Second, The handle, E, crankshaft, C, and yoke, c, when used in connection with the plunger, H, chamber, J, tube, L, and their concomitant parts, all arranged for joint operation as set forth.

CHARLOTTESVILLE, VA.—This Gas-Light Company have declared a dividend of *ten per cent.* payable on demand. Wm. B. Mallory is Treasurer, and Thos. J. Williams Superintendent.

Things Ancient, Quaint and Rare.

THE BREWERS' COMPANY OF LONDON.

No. 3.

The subjection of the Brewers' Company to the control of the Lord Mayor, is acknowledged in a very humble petition, dated 1435, in which they address the chief magistrate as their "right worshipful and gracious lord and sovereign the Mayor of London."

The brewers' records afford several curious specimens of election dinners, as far back as 1419, the seventh year of the reign of Henry the Fifth.

The presence of females was allowed at these feasts. The brothers of the Brewers' Company were to pay 12*d.*, and the sisters, 8*d.*, and a brother and his wife, 20*d.*; whilst, among the Fishmongers, the members were to pay towards the feast, on their quitting church. "every man, xii*d.*; and for his wife viii*d.*"; and each "for his guest in the same mannere at the assemble, as the wardeyns shall reasonabilly ordeynne."

An account of repairs done in the reign of Henry VI. to Brewers' Hall, which was a large structure on the present site, mentions "the tenement by the great gate," afterwards converted into the company's almshouses.

The preparations of the Brewers' Company to celebrate the second arrival of Henry V. from France, with some general particulars of the procession, are given in the following notice from the company's books:—

"On Thursday, 13 February, 1422, the King came from France to London, and W. Cambrigge, the mayor, rode with all the commonality of the city to meet him; who were all commanded to be clad alike, in white gowns with red capes. The brewers ordered that all householders of their company, and all the brewers' men of 40*s.* a year should provide clothes for themselves, under fine of 20*s.*; but many neglected and yet were let off easily. William, the (company's) clerk, had a gown given to him by the masters. The Queen likewise came on Friday the 21st, and was received in like manner.

The brewers' records give the following interesting account of Henry the Fifth's funeral:—"*William Walderne* was chosen mayor on St. Edmunds day, when it was ordered that the aldermen and crafts should go to Westminster with him, to take his charge, *in barges, without minstrels.*" Every householder was charged to provide a black or russet gown and a black hood; and, after the charge, to be present at the King's funeral. Certain of the crafts were ordered to find 200 torches for the funeral. The brewers provided eight torches on this occasion, weighing 138 lbs. of wax, price 51*s.* 9*d.* The chamberlain gave white gowns to the torch-bearers. and the brewers paid to each 3*d.* a day for two days.

The royal corpse was brought to London on Thursday, November 5, and was met at St. George's bar, in Southwark, by the mayor, sheriffs, and citizens, on foot; the brewers stood at St. Margaret's (Southwark) church-yard, until the funeral procession had gone by, preceeded by the torch-bearers, and then followed to St. Paul's, where a dirge was performed. On the next day, several masses were sung by many bishops and others, who, after eating, preceded the corpse to Westminster, with the mayor and civic authorities. The torches were held at the gate of the abbey until all had entered; and, when brought back, weighed 112 lbs., and were sold for 28*s.* Every householder from the church of St. Magnus to Temple-bar had a servant holding a torch at his door while the procession passed. The burial was solemnized on Saturday, November 7, when there were offered at the high altar, four steeds royally trapped, with a knight, full and whole armed with the king's coat armour, and a crown upon his head, sitting on one of the steeds. After mass, 200 cloths of gold were offered.

A Brewer's servant, a few mornings since, to gain a small wager, ate 23 hard boiled eggs, and three loaves, without being allow'd any drink; but no being able to eat 3 eggs more, he lost the prize.—*April*, 1730.

MEDALS AWARDED TO THOMAS GLOVER'S PATENT DRY GAS-METERS.

MANUFACTORIES

SUFFOLK ST. CLERKENWELL GREEN. & ALLEN ST. GOSWELL ST. LONDON.

BOSTON, Mass., 1 Barrett Street,—August 2, 1860.

RICHARD GLOVER begs to inform Gas Companies, and Contractors, that he has always on hand a large assortment of Thomas Glover's (of London) celebrated Dry Gas Meters.

Thomas Glover's Meters have now been in use in the United States and British Provinces, for the last Fourteen Years, and are extensively used by many Gas Companies, to their entire satisfaction; and R. Glover can with all confidence, refer to them in proof that Thomas Glover's Meters are—the most Perfect in Principle—the most Correct in Registration—and more Durable than any other Dry Gas Meter made in the United States or Great Britain. R. Glover will at all times be glad to repair any Gas Meters sent him at the above factory. If any of them are of Thomas Glover's manufacture, and of a more recent date than Three years, he will make no charge.

DOWN & MERRIFIELD,

Nos. 340, 342, 344 and 346 West Twenty-second Street, North River, NEW YORK CITY,

MANUFACTURERS OF

WET AND DRY PATENT GAS-METERS,

Pressure-Registers, Pressure-Indicators and Gauges, Station, Show, Customer, and Experimental Gas-Meters, Centre or Hydraulic Valves, Governors, Compensators for Exhausters, and the Standard Testing Gas-Holders* for Proving Meters, now used in the State of New York in compliance with an Act of the Legislature. Also, Bunsen's Photometer, with complete Apparatus for working the same.

*The standard of measurement of this Gas-Holder is given by Professors Torrey, of the U. S. Assay Office; Joy, of Columbia College; Gibbs, of the Free Academy and several other distinguished scientific gentlemen.

JOHN J. GRIFFIN & CO.,

No. 7 BEEKMAN Street, and 76 West 37th Street,

NEW YORK CITY,

MANUFACTURERS OF WET AND DRY GAS-METERS,

Station-Meters, Proving-Machines, Show-Meters, Test-Meters, Pressure Indicators, &c.

All of our Work is Guaranteed to be of the First Quality, as well as the material, and for this we can refer to numerous Gas-Light Companies.

JOSEPH LENNIG & CO.,

Nos. 313 & 315 NEW MARKET-St., above Vine-St., Philadelphia, Pa.,

MANUFACTURERS OF

WET AND DRY

PATENT

GAS-METERS,

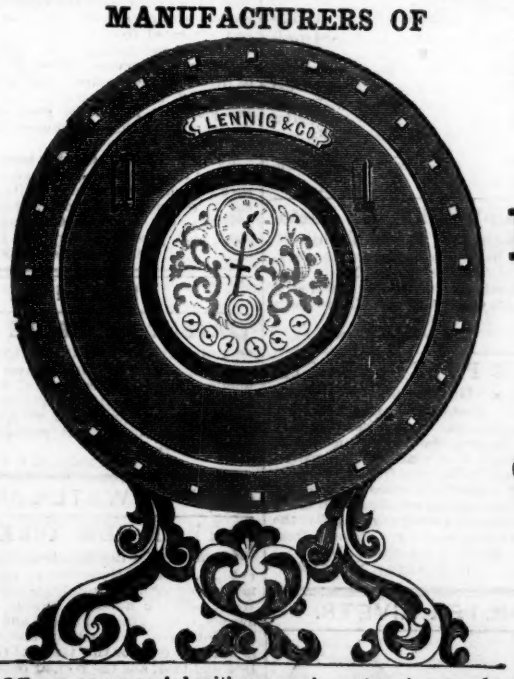
STATION,

SHOW, CUSTOMER,

AND

EXPERIMENTAL

METERS,



PHOTOMETERS,

PRESSURE-REGISTERS

INDICATORS,

AND

GAUGES,

GOVERNORS, METER - PROVERS

CENTRE-SEALS,

FLUID GUAGES, &c.

The flattering Testimonials we are receiving from Gas Officers, accompanied with expressions of such general satisfaction, and the fact of a tried experience for fourteen years, must present itself as a security to parties desirous of securing the most reliable Instruments. We therefore recommend our Patent Dry Gas-Meter, believing it superior to any Meter manufactured. Messrs. J. Lennig & Co. confine their sole attention to the business of Gas-Meter making.

Our materials are the best in use; the strictest attention is given to workmanship, and we guarantee entire satisfaction to all purchasers.

Purchasers may at any time inspect our Works, and the materials of which our Meters are manufactured. We are fully prepared to execute all orders, upon the shortest notice, and it will be to the interest of parties to call upon us. ☞ Each Meter Tested Separately by a Sworn Inspector, and Sealed when desired. ☜

METERS REPAIRED AND FORWARDED WITH DISPATCH.

COAL-OIL & CANDLES.

CANDLES FROM COAL.—Manufactured by the New York Paraffine Candle Co. Under Meucci's Patent. The above Company having recently made great improvement in their mode of manufacture, now offer to the public a Candle superior to any other in the market. They give a softer and more brilliant light and burn 6 hours to the pound longer than the best wax and sperm, and considering the strength of the light, are the most economical Candles in use.

CAUTION.

As unscrupulous persons are already offering imitations of these Candles, purchasers should bear in mind, that every box sold by this Company is stamped with the annexed trade mark, to counterfeit which is felony.

For sale by all first-class grocers, and to the trade by WM. E. RIDER,
General Agent of the Company,
16 Beekman Street, New York.

STANDARD Photometric Candles.—Owing to a number of Applications made to me for information concerning the supply of the "Standard Sperm Candles," used in Photometries, I have obtained a supply, from which I can furnish those who require them with full directions for use. T. W. PARMELE.
No. 4 Irving Place, New York.

TO CANDLE AND SOAP Makers.—Processes with drawings to manufacture every kind of candles and soaps by different processes: Candles by distillation, saponification, French candles, common candles, hard and soft soaps, palm soaps; processes to bleach palm oil and make candles out of it; purification of tallow; essays on greases and soaps. Address, Professor H. DUSSAUCE, Chemist, New Lebanon, N. Y.

J. L. McREA, Dealer in Coal Oils and Lamps, Binnacle and Signal Light Oils, 139 Water street, New York.

Rosin Oil and Rosin.—For sale of our own manufacture a superior article of ROSIN OIL, for Gas purposes. Also Refined Oil. For shipment in secure iron-bound barrels, or by any single barrel.
Address MARYLAND GAS COMPANY, No. 6 Bank of Baltimore Building, Baltimore, Md.
P. S. This Company is also prepared to construct their superior Patented GAS WORKS of any capacity, from that required for a private dwelling, hotel, church, college or factory, to such as will supply cities and towns, complete in all their parts for the manufacture of GAS, from either Rosin Oil, Coal, or Rosin.

THE LUTHER ATWOOD OIL CO.—Manufacturers of Superior Illuminating, Machinery and Binacle Oils. Office, No. 34 Burling Slip, New York.

EMPIRE CITY CAMPHENE Works.—Aaron Seeley, Manufacturer and Distiller of camphene, alcohol, burning fluid, coal-oil, and dealer in naval stores, of every description. 32 and 34 Burling Slip, New York.

H. RYDER & CO., New Bedford, Mass.—Purchasers and Manufacturers of Semi-Crude Paraffine. Ryder's patent Paraffine Candles, manufactured and for sale.

NEW-BEDFORD OIL CO.—Office foot of South-st., New-Bedford. manufacture coal-oil for illuminating and lubricating purposes, of the best quality
ABRAHAM H. HOWLAND.
Our Coal Oil will burn in all Kerosene Lamps

LUBRICATING COAL OIL. Crude Oil, and Paraffine.—Calvin Dickey, Manufacturer of Lubricating Coal Oil, free from odor and chemicals, and warranted to be as good for cotton and woolen machinery as lard oil. This oil is now also used by several rail roads in its pure state. Samples sent to responsible parties. Also 32° crude oil, which will yield 75 per cent. of burning oil; and slack pressed Paraffine of superior quality. CALVIN DICKEY,
Newark, Ohio.

OLEOMETERS.

OLEOMETER, OR HYDROMETER. For Kerosene, Coal Oils, Petroleum and other Distilled Oils. Scale by Dr. Gerner. Manufactured and sold by
G. TAGLIABUE,
296 Pearl st., New York.

PORTABLE GAS-WORKS.

THE AUBIN GAS-WORKS CO., No. 44 State street, Albany, N. Y., will refer parties wanting GAS-WORKS FOR VILLAGES to seventeen of their Village Works now in operation in the United States and the Canadas in *every one of which the profits of the company are ten per cent. and upwards, and yet good gas is furnished.* Agents wanted to extend the sale of the AUBIN PORTABLE GAS STOVE for dwellings, factories, &c., which will make 1000 feet of gas in five hours, and with greater simplicity, safety and economy, than any other known apparatus.

BUTLER'S PATENT PORTABLE ROSIN GAS-WORKS,
FOR
DWELLINGS, CHURCHES, COUNTRY VILLAGES
AS WELL AS FOR CONSUMERS IN LARGE CITIES.
JOHN BUTLER,
No. 112 Fulton-st and 15 Henry-st.,
Brooklyn, N. Y.

FOR LIGHTING RAILROAD CARS AND STEAMBOATS WITH GAS.
The whole process of Filling the Gas-Holders of a Railway Train, requires but Three Minutes.
APPLY TO THE
NEW YORK CAR & STEAMBOAT GAS CO.,
No. 117 Fulton st., N. Y.

C. R. WOODWORTH, Manufacturer of
PORTABLE GAS WORKS,
74 WALL STREET, New York City.

PORTABLE GAS WORKS.—S. T. McDOUGALL'S PATENT Portable Gas Works, for making Gas from Rosin, Rosin Oil, Coal Oil, Naptha, Grease, etc. These Works combine the latest improvements in gas making, and are guaranteed to be superior to any in market. They are made of all sizes, suitable for either country or city use. No county house is complete without its Gas Works. Gas Stoves of every description on hand and made to order. For sale by S. T. McDougall, 170 Center Street, New York.
Agents wanted in other cities to sell rights or machines

GAS FOR THE COUNTRY.—C. WOOSTER, Manufacturer of Improved Portable Gas Machines, for Villages, Public Institutions, Churches, Hotels, Railroad Depots, Factories, Mills, Machine-Shops, Plantation Dwellings, &c. Office, 256 Canal street, near Broadway.
This Machine has been in successful operation for years, in many of the best residences and factories in the country, and for simplicity of construction, ease of management and economy of light produced, possess advantages over all other machines for the purpose now in use. It is adapted to the making of Gas from Crude Rosin or Rosin-Oil, producing a Gas of twice the illuminating power of Coal-Gas, at about one half the price usually charged for that gas.
Every Machine is sold under a strict guarantee to operate according to representation, and no payment required until the fact is demonstrated by actual use.
For further particulars, and descriptive pamphlet containing references to numerous parties now using the apparatus, address
C WOOSTER,
No. 256 Canal-st., near Broadway. N. Y.
For Engravings, see AMERICAN GAS-LIGHT JOURNAL, for June, 1860, page 245.
☞ Responsible Agents wanted, with whom liberal arrangements will be made.

APPLETON'S IMPROVED GAS- Works, for Factories, Hotels, Dwellings, and Towns. The most simple and economical works in use, furnishing a superior light to coal gas at a cost of one half a cent per burner per hour. It does not injure trees, or plate and is not affected by cold. For Circular and Terms apply to APPLETON & GRAHAM,
56 Washington street, Boston.
For Engravings, see AMERICAN GAS-LIGHT JOURNAL for April, 1860, page 213.

ROSIN GAS-WORKS, for Factories, Hotels, and Public Buildings. These works may be seen in operation at the Berkshire Woolen Mills, Great Barrington, Mass.; Manchester Mills, Manchester, Ct.; A. A. Van Alen & Co's. Factories, Stuyvesant Falls, N.Y., and many other places JAMES O MORSE & CO.,
76 John-st., New York.

MARSH'S PATENT ROSIN or Sun-Light Gas-Works, for Private Dwellings, Hotels, Factories, Railway stations, Sugar-Houses, Towns, &c. By the peculiar construction of the Retorts, the largest amount of decomposing surface is obtained in the smallest space. 2d. Gas is manufactured from crude rosin, without the least deposit of carbonaceous matter in the retorts or pipes: thus enabling them to be operated continuously, generating rapidly the best and cheapest illuminating gas obtained from this material. ALFRED MARSH & CO.,
241 Broadway, New York.

GASOMETER RIVETS.

PHILLIPS & ALLEN, Pennsylvania avenue, above 22d street, Philadelphia.—GASOMETER RIVETS of all kinds.

LIGHT-HOUSE BOARD.

OFFICIAL.—NOTICE TO MARINERS.—No. 104. — Africa—Southeast Coast—Fixed White Light at mouth of Buffalo River.
TREASURY DEPARTMENT, Office of Light-House Board, Washington, Dec. 20, 1860.
Official information has been received at this Office that the Colonial Government at the Cape of Good Hope has given notice, that on and after the 25th day of August, 1860, a light would be exhibited from the light-house recently erected at the entrance of Buffalo River, East London, Southeast coast of Southern Africa.
The light is a *fixed white* light, elevated 45 feet above the level of high water, and visible in clear weather from a distance of about 11 miles.
The light-house—painted in alternate bands of red and white—stands on the reef at the south side of the entrance of the river.
R. SEMMES, Secretary.

NOTICE TO MARINERS.—No. 107.—Mediterranean.—Coast of Egypt.—Fixed Light at Port Said.
TREASURY DEPARTMENT, OFFICE LIGHTHOUSE BOARD, WASHINGTON, Feb. 5, 1861.
Information has been received at this office that a light has recently been exhibited from a light-house at Port Said, twenty-nine miles Southeast of the Damietta mouth of the Nile, Coast of Egypt.
The light is a *fixed white* light, placed at an elevation of sixty-six feet above the mean level of the sea, and should be seen from the deck of a ship at a distance of nine miles in clear weather.
The illuminating apparatus is dioptric, or by lenses of the third order.
The lighthouse is a skeleton tower of wood, and stands in latitude 31° 16′ North, longitude 32° 19′ 30″ East from Greenwich.
The bearings are magnetic. Variation 6° 10′ West, in 1861. By order:
R. SEMMES, Secretary.

MISCELLANEOUS.

MESSRS. J. WRIGHT & CO., CONSULTING ENGINEERS and SOLICITORS of PATENTS, No. 42 Bridge street, Blackfriars, London, E. C. Patents for inventions obtained in all countries where Patent Laws are in force.

A LAMP CHIMNEY that will not break! This invention possesses many advantages over the glass chimneys now used on Coal Oil Lamps. They do not break from the heat, falling, cleaning, or any ordinary usage.
THEY FIT ALL THE BURNERS NOW IN USE.
For particulars call or address the Patentees and Manufacturers,
HORNING & HUMPHREY,
No. 321 N. Second St.
Philadelphia.

GAS THERMOMETERS FOR ascertaining and regulating the temperature of the gas while passing through the purifiers into the station meters. For sale at the Rooms of the AMERICAN GAS-LIGHT JOURNAL.

BURTIS' PATENT COMPENSATING COUNTERBALANCE FOR GASOMETERS.—This Improvement consists in making the attachment to the Gas-Holder by counterweights in such a manner as to effectually prevent it from getting out of level so as to bind, and also to prevent any escape of Gas at Cup or Hydraulic seal, where the Holder is on the Telescopic plan. Holders that work out of level, are thus evenly balanced, and prevented from binding or lodging against Tank-wall and falling down, thereby being rendered unfit for service. Where Holders or sections of Holders cannot be used on account of the above difficulties, this arrangement will remove them, and place the Holder in good working order; moreover, with this attachment, deep tanks are not necessary
BURTIS' COUNTERBALANCE has been in use for three years at the Gas-Works, Chicago, Ill. Its resistance to high winds and snow-drifts, is alone sufficient to recommend its general adoption. For Engravings, see AMERICAN GAS-LIGHT JOURNAL for June, 1860, page 221. Address P. T. BURTIS,
Engineer Gas-Works, Chicago, Ill.

ROOFING.

PATENT ASPHALTE ROOFING and SHIP SHEATHING FELTS, the cheapest, best, and most durable ever offered to the public. Circulars, samples, &c., will be forwarded free. Agents wanted for city and towns. None genuine unless purchased of AARON A. DEGRAUW, 242 South street, our sole agent for the United States.
CROGGON & CO., London

CROTON WATER ARREARS.

CITY OF NEW YORK, Department of Finance, Bureau of Arrears, Feb. 21, 1861.—Redemption of Lands and Tenements Sold for Taxes and Regular Rents of Croton Water.—Public notice is hereby given to the owners, mortgagees and lessees and persons otherwise interested in the lands and tenements sold in the year 1859 for the taxes of the years 1852, 1853 and 1854, and the regular rents of the years 1852 and 1853, that a detailed statement of such lands and tenements as have not been redeemed from the said sale is published in the *Evening Post*, a daily newspaper, printed and published in the City of New York. Such statement describes the lands and tenements sold and not redeemed, the amount and the term of years for which they were respectively sold, when the time for the redemption thereof will expire, &c., &c.
JOSEPH C. PINCKNEY, Clerk of Arrears.

GAS-HOLDERS.

GASOMETERS, RETORT-HOUSE ROOFS, WATER-TANKS,
PURIFYING-BOXES, COAL-CARS, COKE BARROWS,
AND ALL KINDS OF
WROUGHT-IRON WORK FOR GAS AND WATER WORKS.
Manufactured by GEORGE W. KRAFT, Chestnut street wharf, West Philadelphia, Pa.

GEORGE STACEY, Cincinnati, O., Manufacturer of single and Telescopic Gasholders, Wrought-Iron Bridges, Girders, Joists and Stairways, Coke and Coal Wagons, Rakes, Screens, and other Gas-works tools, Slide and Cup Valves, Bolts, Nuts, Chisels, Ladles and other tools, Wrought-iron roofs, for Slate and Corrugated Iron, Gas Purifiers, Washers, Centre Seal Valves and other Gas apparatus, Boiler-plate Retort Lids. Refer to—
Cincinnati Gas Light & Coke Co.
Nashville Gas-Light Co.
Springfield Gas-Light Co.
Columbus Gas-Light Co.
Cleveland Gas-Light Co.
Covington and Newport Gas Light Co.
Memphis Gas-Light Co.
Indianapolis Gas-Light and Coke Co.
James H Caldwell, Esq., New Orleans.
John Jeffrey, Esq., Cincinnati.

POOLE & HUNT, Baltimore, Md., are prepared to execute orders for
GAS-HOLDERS,
IRON-ROOF FRAMING,
And all other Descriptions of
Iron Work for Gas-Works, Water-Pipes and Heavy Castings and Machinery Generally.

GAS-HOLDER FOR SALE.—25 feet diameter, 14 feet high, capacity about 6,800 feet. Has been in use but a short time. Good as new. Cast iron guide frame, balance weights and chains complete. Will be sold for $500, (which is less than half its cost) if applied for immediately. Address
M., Box 406 Post Office
Philadelphia, Pa.

GAS & WATER-PIPE.

W. & J. GRIFFITHS & CO.—City Tube Works, Malleable Iron, and Brass Foundry, No. 27 North Seventh Street, Philadelphia. Manufacturers of Wrought Iron Pipe, Lap Welded Flues and Fittings: also Brass Work of all descriptions, for gas, steam and water, Particular attention given to heating buildings, &c.

PARIS'S PATENT
GLASS-ENAMELLED WROUGHT IRON TUBES.
PROSSER'S PATENT
LAP-WELDED IRON BOILER TUBES.
TUBES FOR ARTESIAN WELLS, CONVEYING STEAM OR WATER, SHAFTING, &C., SCREWED OR COUPLED TOGETHER, IN VARIOUS WAYS.
THOS. PROSSER & SON, 28 Platt-st. N. Y

CAST AND WROUGHT IRON Pipe, Branches, Elbows, Sleeves, &c. Lamp-posts, Wrought iron Lanterns for Lamp-posts, Gas Retorts (clay or iron), Street Mains in 9 or 12 feet lengths. Sheet iron cut to pattern for Gas-holders. For sale by the manufacturers' Agent,
HENRY G. NICHOLS, 24 Pine-st N. Y.

HUNTER, KELLER & CO., Manufacturers of
WROUGHT-IRON PIPES, AND FIXTURES
of all descriptions, for
STEAM, WATER AND GAS,
144 Centre street, New York.

GIRARD TUBE WORKS. MURPHY & ALLISON, Proprietors. Wrought Iron Coke-Welded Tubes, for Gas, Water, Steam, &c. Wrought, Cast and Malleable Iron Fittings, Steam and Gas Cocks, Valves. Also, Galvanized Tubes and Fittings.
Office 1908 Market street, Philadelphia.

AMERICAN TUBE WORKS.—W. G. Smith & Co., Forty-sixth street, east of 10th Avenue, New York City. Manufacturers of WELDED IRON PIPE, for Steam or Gas, of all sizes, from 1-8th to 8 inches.

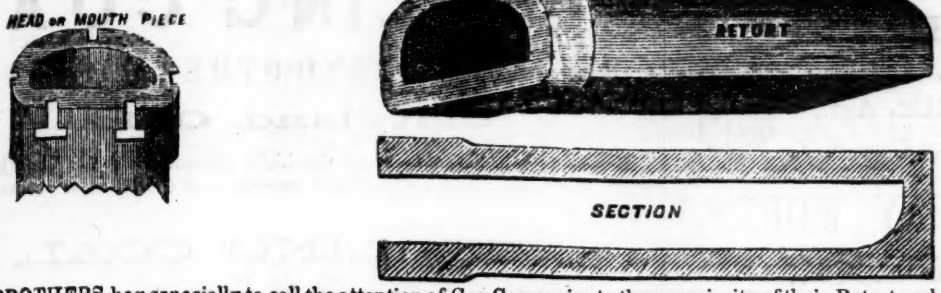
JOSEPH NASON & CO., 61 BEEK- MAN STREET, corner of Gold street, New York, Manufacturers of Wrought and Cast Iron Pipes, and every description of Steam and Gas Fittings, used by Engineers, Manufacturers, and Gas Fitters.

Boiler Flues,	Back Pressure Valves,
Steam Boilers,	Steam Traps,
Boiler Pumps,	Steam Whistles,
Steam Pumps,	Guage Cocks,
Steam Gauges,	Gas Cocks,
Safety Valves,	Gas Meters,
Stop Valves,	Fitters' Tools,
Check Valves,	Proving Pumps,
Governor Valves,	Screwing Machines.

JOSEPH NASON,
HENRY R. WORTHINGTON.

KING BROTHERS,

STOURBRIDGE, ENGLAND, FIRE-BRICK AND RETORT WORKS.



KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for Burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning thus rendering them

FREE FROM CRACKS AND CORRECT IN FORM.

By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize

RETORT OVENS, FIRE-BRICKS, GUARDS, SADDLES, RABBITTED BURS, FLUES, AND QUARRIES, ARE ALL MANUFACTURED OF THE SAME QUALITY OF CLAY.

EVERY RETORT AND BRICK IS BRANDED "KING BROTHERS, STOURBRIDGE."

HARRIS & PEARSON,

PROPRIETORS OF

BEST GLASS-HOUSE POT, AND CRUCIBLE CLAY.

Manufacturers of Fire-Bricks, Gas-Retorts, and Glass-House Furnace-Bricks of every description.

AMBLECOTE FIRE-CLAY AND BRICK WORKS, STOURBRIDGE, ENGLAND.

CODE, HOPPER & GRATZ,

1500, 1502 and 1504 FILBERT-St., PHILADELPHIA.

MANUFACTURERS OF

Pressure Registers, Pressure Indicators, Pressure Gauges, Photometers, Governors, Station Meters, Customer Meters, (Wet and Dry,) Experimental Meters, (Wet and Dry,) Show Meters, (Wet and Dry,) Meter Provers, Centre Seals, &c.

The high reputation which we have enjoyed for more than twenty-two years, and the fact that we have manufactured a greater number of Gas-Meters than all other manufacturers in this country combined must present itself as a security to parties desirous of securing the most reliable instruments. Having completed a most extensive addition to our Factory, and added many important improvements to our machinery, we are enabled to fill orders entrusted to us with dispatch, and in all cases *Guarantee Entire satisfaction.* Our Patent Rotary-Valve Dry Gas-Meter is now used by upwards of Two Hundred Gas Companies, giving general satisfaction; we therefore recommend it, believing itsuperior to any other Dry Gas-Meter manufactured. All Meters tested separately by a sworn Meter-Inspector, and sealed when desired.

D. E. HILL,

MIDDLEBURY, SUMMIT CO., OHIO,

MANUFACTURER OF

SEWER-PIPES,

IN ALL ITS FORMS OF

Branches, Junctions, Curves, Elbows, Stench-Traps, &c., &c.

WARRANTED EQUAL TO THE BEST ENGLISH PIPE.

EDWARD COCKEY & SONS'

PATENT GAS-VALVES.

These Valves are formed of two Cast-Iron Cylinders, with segmental divisions, having the faces ground gas-tight—the upper Cylinder turning horizontally on the lower one. The lower Cylinder has pipes from each division, communicating with the vessels to and from which the gas is to be passed. The upper Cylinder has corresponding divisions, so arranged as to direct the passage of gas to the different segmental divisions in the lower part, and when it is turned on the face of the lower one, to alter the flow of gas from one vessel to another.

Each valve has an index-plate provided, which is to be attached to the floor, and a pointer on the cover of the Valve shows which way it is turned. Thus, the Manager of the Works can at once see in which direction the gas is passing.

There are about fifty of these Valves now in use, of sizes varying from two to twelve inches, and they are giving great satisfaction. Amongst the Works at which they are fixed, the following may be mentioned:—

BASINGSTOKE.	CANTERBURY.	FROME.	RYDE.
BLANDFORD.	ENNISCORTHY.	GODALMING.	SANDWICH.
CHELTENHAM.	ELGIN.	NEWPORT.	WARMINSTER.

They are in course of erection at other important Works.

IRON WORKS, FROME SELWOOD.

EDWARD COCKEY & SONS

ALSO MANUFACTURE

Purifiers, Scrubbers, Condensers, and other Improved Gas-Apparatus,

HAVING PATTERNS SUITABLE FOR GAS-WORKS OF DIFFERENT SIZES.

GAS, STEAM, SMOKE,

PURE WATER & SOIL PIPE

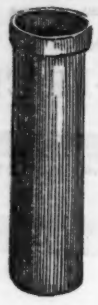
FROM

JOSEPH CLIFF,

Wortley Fire-Brick Works, Leeds, Eng.

T. W. PARMELE, Agt.,

No. 4 Irving Place, N. Y.



STOURBRIDGE FIRE-CLAY WORKS.

E. BAKER & CO.,

SUPPLIERS OF

STOURBRIDGE FIRE-CLAY GOODS, &c.,

TO ALL HER BRITANNIC MAJESTY'S DOCKYARDS, &c.,

24 Wharf, Harrow Road, Paddington.

Mines and Manufactory—BRIERLEY HILL, STAFFORDSHIRE.

Fire-Clay Retorts, Glass-House Tiles, Cupola Bricks, Lumps, Cement, Crucible and best Pot Clays, &c., &c.

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The original Manufacturers of WROUGHT-IRON GAS TUBES, and the Inventors of the Lapwelded Tubes for Locomotive and Marine Boilers. All kinds of TUBES and FITTINGS, whether for Gas, Steam, or Water. Galvanized and Composition Tubes. Chandeliers, and every kind of Brass-work for Gas and Steam.

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By the use of this Fluid, the WET GAS-METER of ordinary construction is rendered the most perfect and most reliable Gas-Measuring Instrument ever offered to Gas Companies. In winter the Meter will continue to work equally well, *however exposed it may be*; and in summer, the level of the Fluid remaining constant without refilling, the measurement of the Gas will be both uniform and constant.

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The Advertiser wishes a Situation as manager of a Gas-works or Water-works. His practical experience in these departments, as well as in the general field of Civil Engineering, fits him for any position of scientific requirements or practical details. His testimonials from officers of various Gas, Water, and Railway Companies are conclusive as to these points. Address

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WANTED.—A Situation by a person who has served five and a half years at gas fitting; has superintended gas-works for three years, having had control of two at one time. Can set Lamp Posts, Meters, Retorts, lay Mains, or do any other necessary work about a Gas-Works. Address

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A Practical Gas Fitter and Gas-Engineer desires a situation in a Northern gas-works. A stoker at present engaged with him would like to accompany him. The highest references will be given on addressing

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A Gas-Engineer at present engaged in a Western gas-works, desires a situation from the first of April, when his present arrangement will expire. Address, K. J. care of the Editor of the AMERICAN GAS-LIGHT JOURNAL, through whom his present office was obtained.

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DANIEL THOMPSON,

Machinist and manufacturer of Stop Cocks, Fire Plugs, &c., for Water-Works, Stop Cocks, Valves, Drip Pumps, &c., for Gas-Works, No. 136, Elfreth Alley, Philadelphia.

GAS-METER FLUID.

FLUID for GAS METERS.—The undersigned is prepared to furnish the Glycerine meter fluid in quantities to suit purchasers: *it does not evaporate, can be made to stand any degree of cold liable to occur in this country or in Canada, and does not corrode the metals of the meter. It has been in use successfully for the last three years.*

For particulars, references, &c., address the manufacturer. HENRY BOWER,
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GENGEMBRE'S PATENT GAS-Meter Fluid. It is non-freezing and non-evaporating. Certificates from several companies that have used it may be found in the AMERICAN GAS-LIGHT JOURNAL for December 1st, 1860, page 163. For Sale only by

A. L. BOGART, 592 Broadway, New York.

IRON RETORTS.

CELLULAR GAS-RETORTS.
C. M. CRESSON'S CELLULAR GAS Retorts, Patented October 3d, 1854. Adapted to the manufacture of GAS from Rosin, Coal, Wood, &c., and now in use at the Philadelphia Gas Works. Patent Rights for sale. For information apply to HENRY S. HAGERT, Attorney for Patentee, S. E. cor. of Walnut and Sixth streets, Philadelphia, Pa.

FOR SYMMES' PATENT RE-torts, Mouthpieces, &c. address—
ELLIMAN BROTHERS, 217 Pearl-st., New York.
MORRIS, TASKER & CO, Philadelphia.
Or H. K. SYMMES, Newton, Mass.
See Engravings in AMERICAN GAS-LIGHT JOURNAL for July 1, 1860, page 280.

FINANCIAL.

GAS-LIGHT STOCKS FOR SALE.
THREE HUNDRED THOUSAND DOLLARS of Stocks in various Gas-light Companies in the United States, paying from 6 to 12 per cent. dividend, for sale by JOHN R. MURRAY,
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DEALERS IN THE CELEBRATED

STERLING COAL,

PITTSBURGH AND OTHER GAS-COALS,

Cleveland, Ohio.

We beg to call the attention of Gas-Light Companies to the following; from which, (and others,) and the universal expression of Gas Men, as to the superior quality of

STERLING COAL,

we believe that it is the BEST COAL IN THE COUNTRY.

From the Manhattan Gas-Light Co., New York.

Gentlemen—Yours of the 9th inst. is received. The "Sterling Coal" received from you during the past year worked very satisfactorily—averaging 9520 cubic feet of 15 candle Gas per ton of 2240 lbs., and 41 bushels of Coke weighing 1465 lbs.

We consider it among the best of American Gas Coals, for the quantity and quality of the Gas produced, and also for the excellent quality of its Coke.

I am, Gentlemen, Your Obedient Servant,
CHARLES ROOME, *President.*

From the Rondout and Kingston, N. Y., Gas-Light Company.

Gentlemen—The 600 tons of Coal ordered from you in August, 1859, has now been in use over four months, to my entire satisfaction.

Its average yield is 4 40-100 feet, and a good strong light. The Coke produced equal, both in quality and quantity, to best English Coking Coals. It burns very freely, with little clinker. In purification it is economical, using no more lime than New Pelton. It is superior to any American Coal I ever used. I shall be pleased to give you any further information at my office in New York.

WM. W. HAGUE, 552 Broadway.

From the Sandusky, O., Gas Co.

Gentlemen—This Company has used your Sterling Coal since July 3d, 1856, and are still continuing the use of it with satisfaction to the Company and consumers. The average product has been 8,620 feet of Gas per ton of 2,000 lbs., and 37 bushels of Coke of very superior quality. The Gas is as good as that obtained from Pittsburgh Coal. I consider it the best Coal ever used in our works.

I am, Gentlemen, Yours Respectfully,
WILLIAM HUDSON, Sup't and Sec'y.

From the Toledo, O., Gas-Light Co.

Gents:—Your favor of the 18th inst. to hand and noted.

The Sterling Coal received from Messrs. Butts & Co., the last Summer and Fall, fully sustains the character it has as a Gas Coal, from previous use in our works. We think the quality of Gas is very good, a little better than that produced from the Coal had of them the year previous—yielding 8,666 feet per ton of 2,000 lbs., and 36 bushels of Coke, of very good quality, well adapted to our use.

Respectfully Yours,
GEO. SPENCER, President.

From the Buffalo, N. Y., Gas-Light Co.

MESSRS. F. BUTTS, & CO.—The Sterling Coal we have had from you we find to be an excellent Gas Coal. The yield of both Gas and Coke is good. The illuminating power of the Gas is high and the quality of the Coke is very good.

ROBERT ROBSON, Foreman Gas Works.

From the Cleveland, O., Gas-Light & Coke Co.

Gentlemen—This Company has used between 3,000 and 4,000 tons of your "Sterling Coal," and are still using it with satisfactory results. We find the average product of a ton of 2,000 lbs. is about 8,800 feet of Gas, and about 37 bushels of Coke. The Gas is of good illuminating power and quite free from sulphur or other impurities, one bushel of lime purifying 9,000 feet, and the Coke of very superior quality.

The yield of Gas is about the same as from the Pittsburgh Coal, and the Coke is better adapted to our use.

Yours Truly,
T. DWIGHT EELLS, Secretary.

From the Albany, N. Y., Gas-Light Company.

MESSRS. F. BUTTS & CO.:—*Gentlemen*—We have been using your "Sterling Coal" at these works for two years, finding it all that is important in Gas-making Coal, as respects yield and quality of Gas, and freedom from Sulphur—as much so as any of the Coking Coal now in use. We are disposed to contract for a further supply of the same quality. Very Respectfully,
PAUL A. SABBATON, Sup't.

From the Troy, N. Y., Gas-Light Co.

MESSRS. F. BUTTS & CO.:—*Gentlemen*—The Coal we have used the past year at our works has been mostly "Sterling." It has given us full satisfaction in every respect. S. S. DAUCHY, Sup't.

The following analysis of Sterling Coal was made by Prof. J. LANG CASSELS, Professor in the Cleveland, O., Medical College, who stands at the head of his profession as a Chemist, and any statement made by him can be relied upon with safety.

Sp. gr.	1,288	
Hygremaeric Moisture		1.85
Volatile Combustibl Matters		34.15
Coke, (clear and porous,)		64.00
		100.00
Fixed Carbon in the Coke	62.00	
Ashes, (yellowish white,)	2.00	
	64.00	
COMPOSITION OF ASHES.		
Silex,		0.30
Al mini,		0.45
Sulphate of Iron,		0.75
		2.00
Per centage of Sulphur,		0.28

J. L. CASSELS, M. D.,
Prof. of Chemistry, Clev. Med. Col.

P. S.—The specimen from which the above analysis was made, was taken by myself from a car load, and may be regarded as a fair average; in fact this Coal is very uniform in its characteristics. It also yielded 4 per cent. more gas than the Pittsburgh Coal. J. L. C.

We would also refer to Gas-Light Companies in the following places:

NEW YORK CITY, (Manhattan and New York Co.'s,) BROOKLYN, ALBANY, TROY, WEST TROY, ROCHESTER, OSWEGO, RONDOUT, KINGSTON, ALBION, BROCKPORT, SENECA FALLS, ELMIRA and LYONS, in the State of New York; CLEVELAND, TOLEDO, SANDUSKY, NORWALK and OBERLIN, in Ohio; DETROIT, ANN ARBOR, GRAND RAPIDS and KALAMAZOO, in Michigan; COBURG, in Canada; CHICAGO, Ill., and two Companies in MILWAUKIE, Wisconsin.

The extensive Mines in Pennsylvania, known as the Sterling Hills, (which are the highest in that part of the State,) are wholly under our control, and the Coal is mined and sold only by us or our agents. As the Coal has improved the further we have got in, and being several hundred yards further in than last season, with about a hundred feet more earth over it, *the quality of Coal we mine this year will be better than ever.* Some Coals are good in one or two particulars, and defective in others; but in combining all the qualities desired in a Gas-Coal, we know of none equal to the STERLING. Getting it to this place by Rail-road, a supply can be had during the Summer months, (as well as at all other times,) which is not the case with Coals dependent upon high water for transportation, as are those shipped from Erie, Pa. Having increased our mining facilities, we are prepared to ship on a more extensive scale than heretofore, and should be pleased to receive your orders.

☞ Having discovered that certain unprincipled Coal Dealers are endeavoring to sell an inferior article of Coal, under the name of STERLING, we deem it our duty, as well for your interest as for ours, to notify you, that you may be on your guard in purchasing what you might think was STERLING. *There is but one Sterling Coal Mine, and that Mine we have the full and entire control of;* and Gas-Light Companies can obtain the GENUINE STERLING COAL only by ordering direct from us, or F. WELLINGTON, Syracuse, N. Y., who is our only agent for that State.

F. BUTTS & CO.

CLEVELAND, O., March 1st, 1861.